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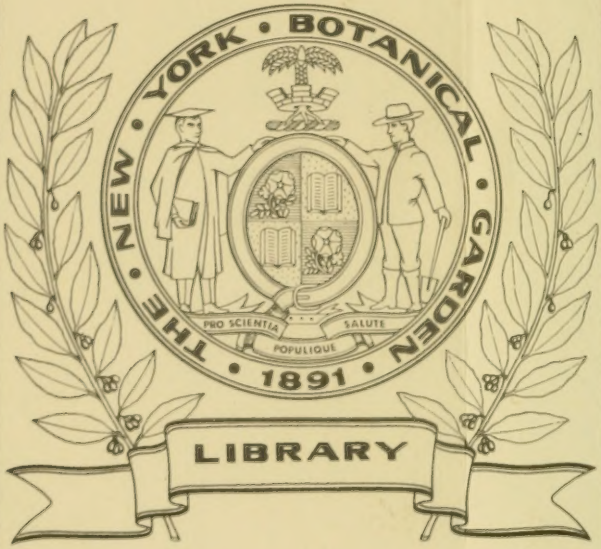
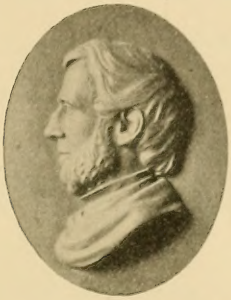


TORREYA

A Monthly Journal of Botanical Notes and News



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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

MARSHALL AVERY HOWE

Volume IV.

NEW YORK

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* Resigned May 10, 1904.

† Elected May 10, 1904.

ERRATA, VOLUME 4

Page 36, 22d line, for *Brefelda*, read *Brefeldia*.
Page 64, last line, for *augustifolia*, read *angustifolia*.
Page 67, 12th line, for *Virburnum*, read *Viburnum*.
Page 89, 3d line of footnote, *for* Lands., *read* Lunds.
Page 99, after line 5, *insert* SPERMATOPHYTA.
Page 111, 1st and 2d lines, *for* New New, *read* New York.
Page 143, 22d line, *for* Thistleton, *read* Thiselton.

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No. 12,	December.	177–201.	December 30, 1904.

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TORREYA

January, 1904

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PHYSIOLOGICAL APPLIANCES — I

By George E. Stone

The appliances described in this series of notes have been improvised in the writer's laboratory during the past few years, in connection with a physiological practicum, and while they may not possess much value to the investigator, they have proved useful in the students' hands. We realize that physiologists have their own methods of demonstrating physiological phenomena. Now and then, however, there appear in various journals helpful suggestions in regard to demonstration methods which the writer has found interesting and profitable, and it is hoped those now to be offered may prove the same to others.

Appliances for determining the Amount of Carbon Dioxide taken up by Plants

As a means of determining that plants take in carbon dioxide under the influence of sunlight, the writer's students in physiology have for some years made use of the following apparatus with satisfactory results.

Fig. 1 shows an appliance designed largely for experiments with leaves. Briefly stated, it is a modification of the Winkler-Hempel apparatus for gas analysis. The apparatus consists of a bulb burette provided with a two-way stop-cock, and has an aperture at the bottom, closed with a rubber stopper, for the insertion of the specimens. The burette is graduated to $\frac{1}{10}$ c.c. and has a capacity of 85 c.c. The method of using the apparatus is quite similar to that of the Winkler-Hempel gas burette. The

[Vol. 3, No. 12, of Torreya, comprising pages 177–201, was issued December 22, 1903.]

only practical difference being that when specimens are placed in the bulb their volume has to be determined; in other words, the capacity of the burette has to be reëstimated. This is done by filling the burette and measuring the contents with another burette or pipette. The principal feature of the apparatus consists in having the specimens in the burette that is employed in making the determination. For experimental purposes we gener-

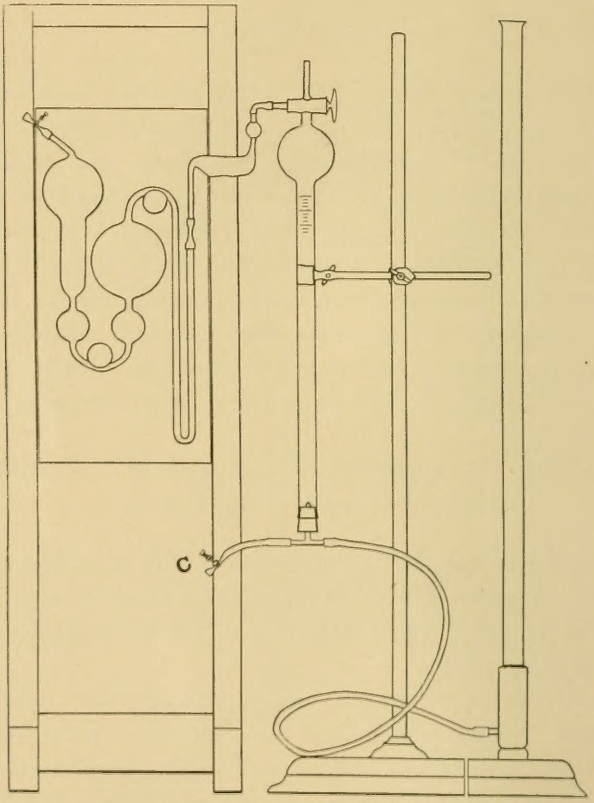

FIG. 1. Apparatus for determining the amount of carbon dioxide taken up by plant tissues.

ally select *Myriophyllum* leaves and have about 5 or 10 per cent. of carbon dioxide in the burette. The method of operation is as follows: The required amount of carbon dioxide is supplied to the burette containing the plants by first filling with water or mer-

cury, and allowing all but 5 or 10 per cent. of this to be replaced by air, and the remaining space by carbon dioxide. After exposing the plants to sunlight for a given length of time, the air in burette is forced over into the potash bulb, and after a short period returned. This is accomplished by the pressure of mercury or water, whichever happens to be used. The difference in volume is then noted and from this is calculated the percentage of carbon dioxide absorbed. Either water or mercury may be employed, and when the former is used we usually take the water from a reservoir suspended five or six feet above the apparatus, in which case we regulate the output of water by the stop-cock shown at *C* in Fig. 1. We seldom allow the contents of the burette to go below the 83 or 84 c.c. mark. In using water, a small portion of the carbon dioxide is likely to become absorbed. The absorption of carbon dioxide, however, can be largely prevented by a drop of oil on the surface of the water. In case mercury is used, no such precaution is necessary. It has been our practice to allow students to make a few analyses of the carbon dioxide, previous to placing the plants in the bulb, in order that they may become familiar with the method and test the accuracy of the same. We prefer very small apertures in the two-way stop-cock; this makes the apparatus much easier to work, and there is less opportunity for leakage. The special bulb burette is made by E. Greiner, of New York.

When it becomes necessary to make experiments with potted plants, we have used for some years the apparatus represented in Fig. 2. This consists of a bell glass set in a paraffined wooden trough filled with mercury. The potted plant to be experimented with is covered tightly with thin rubber sheeting, which permits only the leaves and upper portions of the stems to be exposed. There are two wide-mouthed tubes, one inside the bell glass, *h*, and one outside, *f*, which contain water. These are connected with a U-shaped tube below, with clamps at *a*, *b*, and *c*.

In supplying the apparatus with carbon dioxide, the generator is attached to one of the inlet tubes at the top of the bell glass, and the inner tube, *h*, which is completely filled with water, is

drawn off. This allows a certain amount of gas to enter, but the exact percentage contained in the bell glass must be determined by analysis. This is accomplished by passing a sample of the gas in the Winkler-Hempel burette, which necessitates allowing water to pass from *f* to *h* in order to counterbalance the air pressure. After exposure to light for a required length of time, other samples of air can be taken and analyzed as before. The

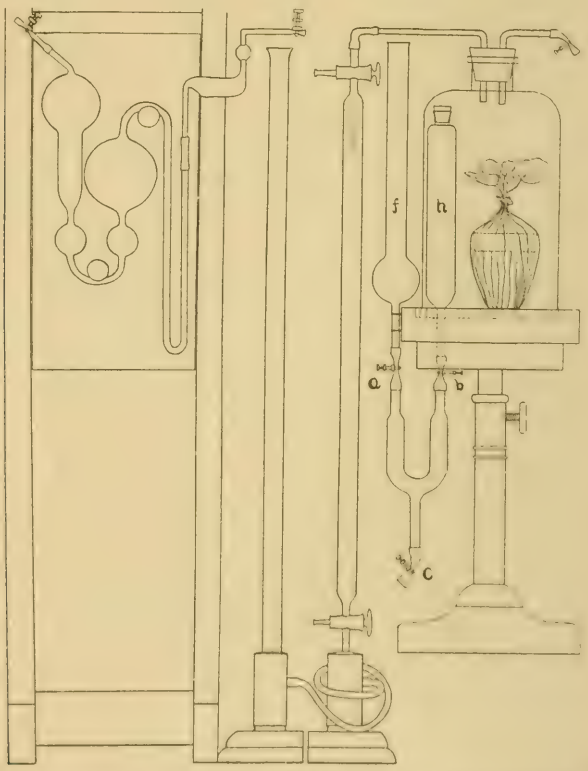

FIG. 2. Apparatus for determining the amount of carbon dioxide taken up by potted plants.

number of samples of air which can be taken depends entirely upon the capacity of the inner tube, *h*, and also the amount of gas, or air, which is utilized each time as a sample for analysis. We have found it better to supply the plants with a considerably large percentage of carbon dioxide, as this renders the results

more marked. The principal feature to bear in mind, in the use of this form of apparatus, is to regulate the inflow and outflow so that the pressure of the air under the bell glass coincides with that outside of it. The amount of carbon dioxide which plants absorb is sufficiently large so that with the use of either of these appliances a slight error in the determination does not prevent their being utilized for demonstration purposes. Such experiments may well precede those with the Pfeffer gas-balloon, in which case more careful details in regard to pressure and tension have to be insisted upon.

Massachusetts Agricultural College, Amherst, Mass.

OBSERVATIONS ON PHALLUS RAVENELII

By Howard J. Banker

In the fall of 1900, several beds of *Phallus Ravenelii* were found in piles of sawdust at Williamsport, Pa., with the plants in all stages of development. "Eggs" were found in abundance from the size of a mustard seed to that of a walnut. In a space less than three feet square over a hundred and fifty were gathered, all larger than a pea while hundreds of smaller ones were to be found. The sawdust was penetrated in every direction by long strings of cord-like mycelium. Most of the smaller "eggs" failed to mature, being checked by the frost, but the plants persisted in coming up until the middle of December or until the ground actually froze hard.

One of the beds was located under a pile of lumber, where it was more shaded and more moist. The *Phalli* in this bed were larger and of more vigorous growth than those in the open. Tempted by their size, the writer made an effort to crawl under the lumber pile to them. The sawdust was found to be remarkably full of what was taken to be masses of "eggs" and unusually matted together by the mycelium, but it was too dark to see clearly of what the material consisted. A quantity was therefore gathered and on returning to the light proved to be very different from what was expected. There was a dense mass

of mycelium forming a tangled net-work and filled with very irregular tubercular masses, ranging in size from .5–5 cm. in diameter.

These tubercles or sclerotia appeared to be enlarged portions of the mycelial threads and were twisted, lobed and convoluted in a very irregular manner. On making sections of these it was found that they consisted of two distinct parts, an outer wall about 2 mm. thick and an inner cavity which either contained only air or was filled with a gelatinous substance. This cavity was observed at this time, in the fall, to be in a state of negative pressure. Those tubercles which had their cavities filled with air would float in water while those containing the gelatinous substance would sink. It was therefore easy to determine, without injury, the character of the different tubercles in this respect.

The wall of the tubercle consisted of a dense weft of mycelium forming apparently a pseudoparenchyma. This was most compact toward the outer surface and became more open toward the interior, terminating at the surface of the interior cavity in numerous free ends. These hyphal ends were about 7 μ wide and quite irregular in form. When the cavity contained the gelatinous substance, this was found to be everywhere penetrated by fine branching threads about 3 μ wide, of uniform size, and running in nearly straight lines. These threads, easily distinguished from the hyphae previously mentioned, seemed to have their origin in the outer wall of the tubercle but just how could not be made out.

There was also observed in the jelly-containing tubercles, certain peculiar bodies which were supposed from their appearance to be crystals of calcium oxalate. These were not numerous and were developed chiefly among the free hyphae on the inner surface of the wall. A portion of a hyphal thread would be enlarged into a globular form about 40 μ wide and would contain within it a spherical body about 22 μ wide and marked with fine radiations.

The larger tubercles in many cases had the appearance of being made up of a fused mass of smaller ones. One such conglomerate mass measured over 8 cm. in width.

The place was not again visited until spring. In April, the lumber pile having been removed, the place was made easy of access and was again examined more thoroughly. All external signs of the *Phalli* had disappeared, but the bed of sawdust was found densely matted together with mycelium which covered a space of several square feet and penetrated the sawdust to a depth of 12 to 15 inches. Throughout the mass there was an abundance of tubercles. They as well as the mycelial cords were now observed to be white in color where not exposed, but when uncovered quickly turned bluish-purple. This change of color was very marked and always occurred first in the finer threads of the mycelium where it would take place so quickly on exposure that it was very difficult to catch sight of the natural white color of the threads before the blue color appeared. For this reason the mycelial threads of *P. Ravenelii* are usually observed to be bluish-purple in color. In a few seconds the blue color would appear on the more exposed prominences of the tubercles, rapidly deepening in color and spreading over the surface, but not at first extending into the depressions between the prominences, owing apparently to the retention of some moisture in these places. The side of a large tubercle which remained in contact with the moist sawdust also underwent no change. This suggested that the change of color was due in some manner to a superficial drying resulting from contact with the air, which appeared to be confirmed by the fact that if the tubercles of the mycelium were immersed in water as soon as removed from the sawdust not only was further change of color checked, but after a few minutes the color which had already appeared faded out and the material soon became entirely white as at first.

By very long exposure to the air, that is, for several hours or days, the color gradually undergoes a further change, becoming a dark reddish-brown and spreading over the entire surface even into the deepest depressions, and this is more uniform and complete in the living plant remaining in contact with its substratum than when removed and dried.

This color change in the tubercles is confined strictly to a very thin layer of the surface and does not penetrate the inner sub-

stance. Even if the tubercle be cut through, the cut surface thus exposed undergoes no change in color, but remains of the same uniform white, and this distinction remains even when the tubercles have become very dark brown or have been thoroughly dried. The brown color is slightly soluble in water.

Specimens of this material have been preserved at the New York Botanical Garden. I have been hoping to have an opportunity to investigate further this color change in the mycelium of *P. Ravenelii* and determine if it was of the same character as the blue color that appears in certain *Boleti* when injured and which Schönbein has shown is due to the action of ozone.* Removal of residence and failure to find such a remarkable growth of these plants elsewhere has prevented my carrying the investigations further.

Southwestern State Normal School,
California, Pa.

JOSEPH HINSON MELLICHAMP

By William M. Canby

Dr. Mellichamp — an excellent botanist of South Carolina — died on James Island in that State on the second of October last.

Joseph Hinson Mellichamp, the son of the Rev. Stiles and Sarah Cromwell Mellichamp, was born in St. Lukes Parish, South Carolina, on the 9th of May, 1829. His father was for many years Preceptor of Beaufort College and afterwards was pastor of St. James Church on James Island. Being a lover of outdoor life and of natural objects, he gave his son a taste for the same and especially for botany, which continued throughout his life. In 1849 he graduated from South Carolina College and in 1852 from the Medical College at Charleston. He then spent some time in Europe, studying in the hospitals of Dublin and Paris. On his return he established himself as a physician at Bluffton, South Carolina, and here he remained most of his life — the exceptions being the time when he was a surgeon in

* Cf. De Bary, Comp. Morph. and Biol. of the Fungi, 15.

the army of the Confederate States and when, during his last years, much of his time was spent with his daughter and only child in New Orleans. It was during this period that, to his great delight, he accomplished a visit to California and its "big trees."

Notwithstanding the diligence required to fulfil the responsibilities of a large practice among the planters and their dependents, he found time for much botanical research and collecting. In the interesting floral region around him were many of the rarer species described by Walter, Michaux, and Elliott. Specimens of these were much prized by the botanical fraternity and, through his correspondents, were largely and freely distributed and are now valued samples in many of the best herbaria.

His good judgment in making observations and clear statements of the results brought him the correspondence and esteem of Doctors Gray, Engelmann, and other masters of the science. For Dr. Engelmann he investigated the flowering and fruiting of some species of *Yucca*, the peculiar oaks of his region, and especially *Pinus Elliottii*, which he practically discovered and, in the excellent notes he furnished, adequately described. Very acute observations on the insectivorous habits of *Sarracenia variolaris* were published in the Proceedings of the American Association for the Advancement of Science. In this paper he recorded his discovery of the lure by which insects are tempted to the fatal pitcher of the leaf; of the fact that the secretion therein is more or less of an intoxicant; and the curious fact that the larva of a certain insect was able to resist the secretion and to feed upon the decaying mass. Dr. Sargent, in his Sylva of North America, acknowledged his services in the studies of the oaks and other trees. Dr. Gray so esteemed his assistance that he named a Mexican Asclepiad in his honor *Mellichampia*. Desirous of helping others, he was one of those useful men who, diffident and retiring, and not caring to advance their own fame, always willingly give to others the benefit of the knowledge they have acquired. It is not too much to say that but for him, considerable of value would have remained unknown of the flora of his district; grateful acknowledgments of this have come from European as well as American botanists.

Dr. Mellichamp was an ardent lover of nature, with a poetic and artistic spirit, and his letters teem with fine descriptions of the various objects which attracted him in his professional drives about the country. He was wont, as the spring approached, to speak of the exceeding beauty of the young flowers of *Pinus Elliottii*, as they expanded their cones over the trees, crowning their robes of green with a haze of purple. His letters show the keenest sense of the loveliness and delicious warmth of a spring in the pines with flowers opening everywhere, the fragrance of the woods, of jessamine and of magnolias filling the air made vocal with the songs of mocking-birds.

But best of all, he was a man to be loved for his qualities of heart and mind. A magnetic and attractive man, his friends and correspondents cannot forget his ready kindness and words of cheer and will cherish his memory. He was beloved by the poor people of his district who, in a touching way, mourned the loss of their "old doctor" as his body was borne to the grave. As might have been supposed he was intensely southern in his feelings and in his love for his native State. He now rests in her bosom; and the well-known lines, slightly altered, may well be applied to him, "Little he'll reck if they let him sleep on in the grave where a *southern* has laid him."

SHORTER NOTES

Primary Venation in Cinnamomum. — In discussing the proper generic affinity of *Cinnamomum affine* Lesq., F. H. Knowlton * makes the assertion that "The joining of the secondaries to the midrib at some distance above the base is distinctly a character of *Cinnamomum*, and *all known species possess it.*" The italics are mine.

In view of the variability of leaves in this respect such sweeping statements should be made with great caution. Both Schimper and Lesquereux † in defining the genus particularly mention

* Knowlton. Flora Montana Form. U. S. Geol. Surv. Bull. 163: 43. 1900.

† Schimp. Pal. Veget. 2: 839; and Lesq. Tert. Fl. 218.

the triple nerves from the base, and an examination of the published figures of fossil leaves referred to this genus shows several species which have the basal secondaries (lateral primaries) inserted at the base of the midrib* and several additional species in which these secondaries are subbasal in some of the leaves.

An examination of the existing species contained in the herbarium of the New York Botanical Garden shows many leaves with basal secondaries in the following species: *Cinnamomum pedatinervium*, *Javanicum*, *obtusifolium*, *pauciflorum*, *Sieboldii*, *nitidum*, *eucalyptoides*, *albiflorum*, *pedunculatum* and *Zeylanicum*.

Edward W. Berry.

Passaic, New Jersey.

PROCEEDINGS OF THE CLUB

Wednesday, November 25, 1903

This meeting was held at the New York Botanical Garden at 3.30 p. m.; Professor Underwood in the chair; 18 persons present.

The appointment of Professor Burgess to fill the vacancy on the membership committee was announced.

Dr. Britton presented a memorial on the life work of the late Mr. Cornelius Van Brunt, which by vote of the Club was ordered spread on the minutes and printed in Torreya.†

The principal paper on the scientific program was by Mrs. Britton, entitled "Notes on further botanical Explorations in Cuba." The party, consisting of Dr. and Mrs. Britton and Mr. Percy Wilson, went to Cuba by way of Tampa, Florida, going direct to Matanzas, which point was reached on August 27, 1903. Extracts were read from her diary, giving an interesting account of the daily happenings during the exploration of the region about Matanzas, Cardenas and Sagua. Many photographs were shown illustrating the regions visited and specimens of some of

* See Lesq. Cret. Fl., *pl. 30. f. 3.* 1874; Tert. Fl., *pl. 36. f. 12*; *pl. 37. f. 4, 5.* 1878; Fl. Dak. Group, *pl. 11. f. 4.* 1892; Newb. Fl. Amboy Clays, *pl. 29. f. 6, 7.* 1896.

† See Torreya, 3: 177. *Portrait.* 22 D 1903.

the more conspicuous plants were exhibited. As the herbarium material secured by the expedition has not yet been studied, no detailed account of the botanical features of the region was attempted. All of this part of the island has been devastated by war. There is no primitive forest and comparatively few large trees are left standing. On the return, a few days were spent in Havana visiting the botanical institutions of that city.

Dr. Britton exhibited specimens of what seem to be two species of hackberry. The common *Celtis occidentalis* of the eastern states is a small tree seldom exceeding 40 feet in height, having smooth, slightly acuminate leaves and globular orange-colored fruits. On an excursion of the Torrey Club to the Delaware Water-Gap some years ago, some much larger trees were observed growing in moist locations and having long acuminate leaves and oval fruits. This seems to be the *Celtis canina* of Rafinesque. It is somewhat widely distributed, its range overlapping to some extent that of *C. occidentalis*, but it always occurs on moister, richer lands and grows to be a much larger tree.

F. S. Earle,
Secretary.

Tuesday, December 8, 1903

The Club met at the College of Pharmacy at the usual hour; 18 persons present; Dr. Rusby in the chair.

Dr. C. A. King, Mr. J. A. Shafer and Mr. Frederick H. Blodgett were elected members of the Club.

The resignation of Mr. B. D. Gilbert as a member of the Club was accepted.

A proposition from the Scientific Alliance was submitted by Dr. Britton, suggesting the weekly publication of notices of society meetings and other items of scientific interest in place of the monthly Bulletin now published. After some discussion the suggestion was unanimously approved.

The scientific program consisted of a paper by Mr. W. T. Horne on "The Vegetation of Kadiak Island, Alaska." The paper was illustrated by a large number of botanical specimens

and by numerous photographs, showing the topography of the island and the characteristics of the different plant formations. Kadiak Island is 58° north latitude and 155° west longitude and is 30 miles from the mainland. It is 90 miles long by 50 wide and has a very irregular coast line. The surface is much diversified and broken. A fresh-water lake about 20 miles long is situated in the northwestern part of the island. It is connected with the sea by the Karluk river and furnishes an ideal breeding-ground for the red salmon. One of the most important fishing stations and canning plants in the world is located near the mouth of this river. The winters are very long, beginning early in October, but they are not intensely cold. The lowest temperature during the two years of Mr. Horne's stay was — 10°. There is much mild weather and frequent thaws. The soil freezes only to a depth of from one to two feet, and the frost is out of the ground early in June. The highest summer temperature noted was 72°. The Chinese laborers in the canning factory make gardens where they cultivate successfully many of the more hardy vegetables.

The principal plant formations discussed were those of the low-lying bogs, the comparatively level grass lands, the higher-lying peat bogs, and the alpine flora occupying the rocky hills. Marine plants are not particularly conspicuous though many brown and red seaweeds occur. Two species of *Potamogeton* are found in the river at the point where the salt and fresh water meet. Above this point the river is comparatively free from vegetation. The country is well watered by small streams. These are often full of various green algae and they are frequently dammed by dense growths of mosses. Some of the smaller slower brooks are completely blocked by dense growths of species of *Vaucheria* which so retard the flow of the water as to form low wet bogs that are covered with a characteristic vegetation. The earliest plant to flower in the spring in these *Vaucheria* bogs is the small *Claytonia asarifolia*. Other conspicuous spring plants are a species of *Rumex*, *Caltha palustris*, and various species of the Cruciferae. These bogs are the most showy in midsummer when filled with *Polemonium acutifolium*, several

species of *Epilobium* and a handsome *Mimulus*. *Epilobium luteum* in particular forms showy masses in the bogs and along the brooks. A large-flowered skunk cabbage (*Lysichiton*) also occurs in wet places frequently marking the course of little brooks along the hillsides. *Carex cryptocarpa* forms a dense zone bordering portions of the river bank.

The drier and comparatively level grass lands are always completely covered by layers of mosses and lichens so that they approach the condition of the tundras. The first spring flowers of the grass lands are the abundant pink blossoms of the little *Rubus stellatus*, which also is a conspicuous plant in the fall on account of the rich coloring of its leaves. The turf consists mostly of *Carex Gmelini*. Scattered plants of species of *Poa* and *Festuca* are frequent, but the dominant grass is a species of *Calamagrostis*. A fragrant grass, a species of *Hierochloa*, called locally "vanilla grass," occurs, but it is not abundant. Other conspicuous plants are *Trientalis Europea arctica*, two species of violets, *Geranium erianthum*, also conspicuous in the fall from its red foliage, a yellow *Castilleia*, *Viburnum pauciflorum*, *Sanguisorba latifolia*, *Galium boreale*, and a large showy *Lupinus*. The salmon berry, *Rubus spectabilis*, is frequent and bears a large, delicious edible berry. In midsummer great patches of fireweed, *Chamaenerion angustifolium*, suddenly burst into bloom, giving a most striking color effect. Later in the season *Solidago lepida* becomes conspicuous. *Lathyrus palustris* was the only plant seen having a vine-like habit.

The peat-bogs occur at the foot of the hills. Among their characteristic plants are *Betula glandulosa*, a shrub reaching two feet in height; *Empetrum nigrum*, with black fruits that are called "blackberries" and are eaten by the natives; and *Ledum palustre*, the leaves of which are used for a tea. *Vaccinium ovalifolium* grows along the upper edge of the grass lands. It furnishes an important economic fruit.

The Alpine flora on the rocky hills consists of a mat-like growth of mosses, Cladonias, *Empetrum*, dwarf blueberries, etc. The first to bloom in the spring is *Mairania alpina*. The fall foliage of this plant is very showy, forming intense red patches

on the hillsides. Other conspicuous plants are *Astragalus arcticus*, *A. nigrescens*, *Chamaecistus procumbens*, *Diapensia Lapponica*, *Lloydia serotina*, *Campanula lasiocarpa*, and various dwarf arctic willows. *Vaccinium uliginosum* and *V. Vitis-Idaea* are abundant and their fruits are of great economic importance to the natives.

The paper brought out an interesting discussion lasting till the hour for adjournment.

F. S. Earle,
Secretary.

NEWS ITEMS

Professor L. M. Underwood has been elected chairman of the Section of Biology of the New York Academy of Sciences.

Professor J. C. Arthur, of Purdue University, Lafayette, Indiana, is spending a month at the New York Botanical Garden, engaged in some special mycological researches.

Dr. D. T. MacDougal, director of the laboratories of the New York Botanical Garden, left New York on January 13 to visit the Desert Botanical Laboratory of the Carnegie Institution at Tucson, Arizona. He plans also to visit Lower California and will probably be absent from the Garden for about six weeks.

Dr. Burton E. Livingston, instructor in plant physiology in the University of Chicago, and Miss Winifred J. Robinson, instructor in botany in Vassar College, who have been devoting several months to studies in the laboratories of the New York Botanical Garden, returned to their respective institutions about the first of January.

The seventh meeting of the Society for Plant Morphology and Physiology was held at the University of Pennsylvania, Philadelphia, December 29–31, 1903. Fifteen papers were presented and discussed. No presidential address was given on account of the absence of the president, Professor Roland Thaxter. The following officers were elected for the ensuing year: president, Dr. George T. Moore; vice-president, Professor Clara E. Cummings; secretary-treasurer, Professor W. F. Ganong. A committee of three was appointed to confer with committees from

other botanical societies upon the subject of union of the botanical societies of the country.

The American Association for the Advancement of Science held its fifty-third annual meeting at St. Louis, December 28, 190 , to January 2, 1904. Papers represented by thirty-seven titles were read before Section G (Botany), the program occupying four half days. Mr. F. V. Coville, retiring chairman of Section G, was absent and his vice-presidential address was accordingly omitted. A committee consisting of Professor C. E. Bessey, Dr. B. T. Galloway and Professor Conway MacMillan, was appointed to consider the movements now under way looking to the preservation of the Calaveras groves. On Friday morning, January 1, the Section went as a body to visit the Missouri Botanical Garden on the invitation of the director, Dr. William Trelease. Among the officers for the ensuing year, Professor W. G. Farlow was elected president of the Association; Professor B. L. Robinson, vice-president of the Association and chairman of Section G; Professor F. E. Lloyd, secretary of Section G.

The tenth annual meeting of the Botanical Society of America was held at St. Louis, December 28 to 30, 1903, under the presidency of Professor C. R. Barnes. The address of the past-president, Dr. B. T. Galloway, was entitled "What the Twentieth Century Demands of Botany"; this address was published in full in *Science* for January 1, 1904. In addition to the address, thirteen papers were presented. Officers were elected as follows: President, Mr. F. V. Coville; vice-president, Professor C. E. Bessey; secretary, Dr. D. T. MacDougal; treasurer, Dr. Arthur Hollick; councilors, Professor B. L. Robinson and Professor J. M. Coulter. Grants of $150 to Dr. C. J. Chamberlin to aid a study of the spermatogenesis, oögenesis, and fertilization of *Dioon* and *Ceratozamia*; of $150 to Professor F. E. Lloyd to aid a study of the comparative anatomy, transpiration and stomatal action of spinose and succulent plants, to be carried on at the Desert Botanical Laboratory of the Carnegie Institution; and of $50 to Professor J. C. Arthur to assist in making drawings of the Uredineae, were approved.

Vol. 4 No. 2

TORREYA

February, 1904

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PHYSIOLOGICAL APPLIANCES — II. *

By George E. Stone

Apparatus for Collecting and Determining the Amount of Oxygen Given off by Aquatic Plants

The appliance shown in Fig. 3 has been used in the writer's laboratory, to some extent, for collecting and determining the amount of oxygen given off by aquatic plants. It is based on the same principles as that shown in Fig. 1,† namely, either water or mercury is employed to force the collected gas into the absorbent bulbs and return the same.

In setting up the apparatus the graduated burette and funnel are filled with water. As the gas is given off from the aquatic plants it is directed from the funnel to the burette, where it is retained, a corresponding amount of water being displaced through the tube, *a*, which should be below the water level in the cylinder below. After a required amount of gas has been collected, the pinch-cocks at *b* and *c* are closed, the funnel removed and the gas is forced over into a phosphorus or pyrogallic acid and potash bulb and then returned. The amount of oxygen absorbed is then estimated. The remaining gas can also be tested for carbon dioxide and other gases if necessary. An appliance made on this principle, provided with a smaller caliber and more finely divided burette, has its advantages for closer work.

* Continued from page 5.

† Torreya, 4 : 2. Ja 1904.

[Vol. 4, No. 1, of Torreya, comprising pages 1–16, was issued January 27, 1904.]

A much more simple apparatus, which answers the same purpose, is shown in Fig. 4. This method of demonstration we have

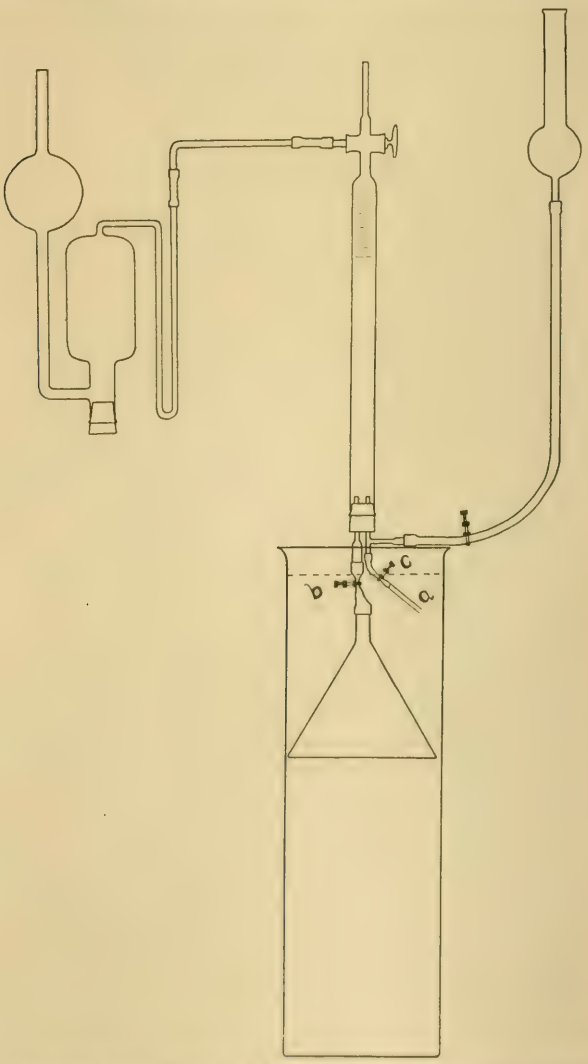

FIG. 3. Apparatus for collecting and determining the amount of oxygen given off by aquatic plants.

required of our physiological students each year. It consists of a test-tube, either plain or graduated, placed over a glass funne

in a cylinder containing aquatic plants. The test-tube is filled with water and, as the gas collects, the water is displaced. After 15 or more cc. of gas is collected, the funnel is dropped into the cylinder and a stick of phosphorus, fastened to a bent wire, shown at the right, is inserted into the tube containing the gas. The phosphorus should be left in the tube for some hours, and after removing it the difference in the water levels is noted and the per cent. of oxygen is roughly determined. In most experiments, our students find that about 33 per cent. of the gas is absorbed by the phosphorus.

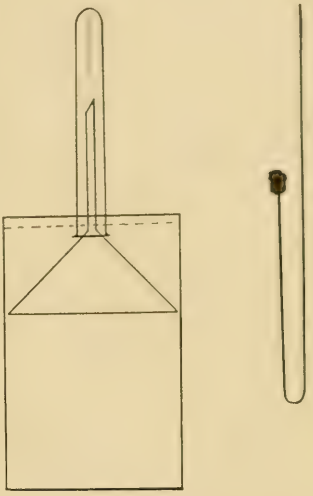

FIG. 4. Method of collecting and testing the gas given off by aquatic plants.

METHOD OF DETERMINING HOURLY TRANSPIRATION

The following method of determining the hourly transpiration of rooted plants has been occasionally employed in our laboratory. The device consists of a calcium chloride jar, to which is attached a small tube, both of which contain water. See Fig. 5.

A small light float of pith attached to a straw, carrying a wire on its upper end, registers on a blackened cylinder the variation of the water level due to transpiration. On the surface of the column of water in the small tube there are a few drops of heavy paraffine oil, *o*. This oil prevents loss of water, and serves as a suitable rider for the float. In our demonstration experiments we make use of willow cuttings which have developed roots and leaves. These cuttings are started in water and as soon as gathered they are fitted with a rubber stopper of suitable size to fit the calcium chloride jar. Rooted willow cuttings are far superior to fresh cut stems and leaves in this experiment on account of the ends of the latter becoming clogged with slimy material, thus preventing absorption and rendering the results of little value.

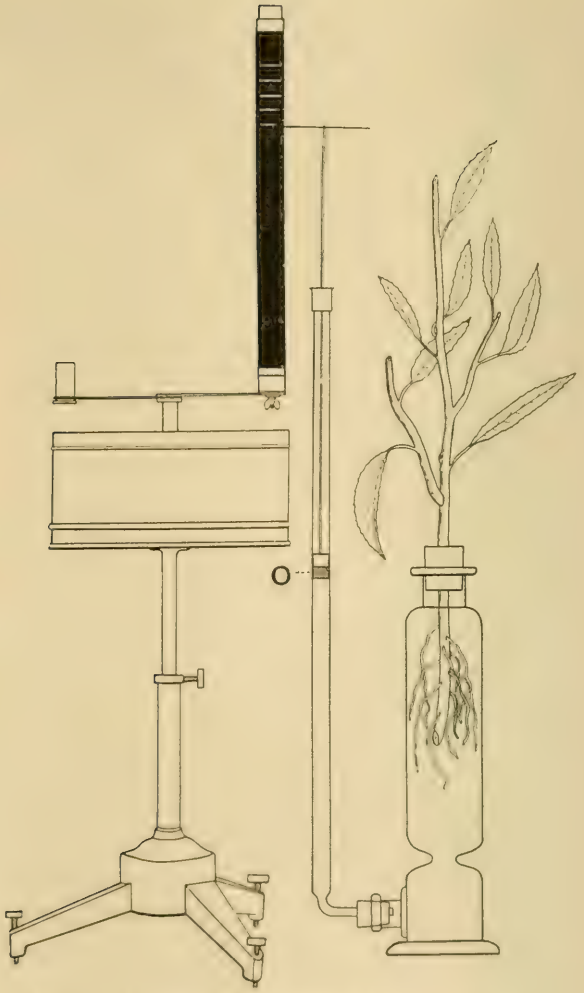

FIG. 5. Apparatus for determining hourly transpiration.

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, MASS.

AN INTERESTING UNPUBLISHED WORK ON FUNGI *

By J. C. Arthur

It is not often that a work in systematic botany remains a hundred years without being given to the public in some form of the printer's art, if possessed of genuine merit. Yet this has been the fate of Hedwig's "Descriptio et Adumbratio Microscopico-analytica Fungorum." Every student of plant-rusts has noticed that many species of Uredinales first published in de Candolle's edition of the Flore Française, issued in 1805, with a supplementary volume in 1815, are accredited to "Hedw. f.," often with citation of the work and of the particular plate bearing an illustration of the species. Even the genus *Gymnosporangium* was not evolved by the learned author of the great French flora, but by the obscure "Hedw. f.," and its type species, *G. conicum*, is illustrated in "Hedw. f. Fung. ined. t. 2." It would seem that this inedited treatise, from which de Candolle secured such rich gleanings, must have been a work of superior value. I had often wondered who the author could have been, and why a work of such evident merit had never been published, and about two years ago having an opportunity to call at the Candollean Library in Geneva, Switzerland, I made inquiry about the matter. I found, as I had correctly surmised, that the manuscript was in the library. Through the kindness of M. Casimir de Candolle, the present owner of the library, I was permitted to examine it. It is well preserved; and I was enamored with the beauty and skill displayed in its preparation. It is a small quarto, with pages of letter-sheet size. There are about fifty pages of text, and thirty-one pages of plates, the latter most exquisitely drawn and colored by the author. The work deals largely with the Uredinales, and is remarkable for the clearness with which the observations are made, and the discrimination which the author shows in presenting the more important characters of the fungi which he describes. The full title page runs as follows:

* Read before the Torrey Botanical Club, January 27, 1904.

Descriptio et adumbratio microscopico-analytica
Fungorum
Aliarumque plantarum cryptogamicarum ad
eorum familiam pertinentium.
Auctore
D. Romano Adolpho Hedwigio

Professori Botanices in Academia literarum Lipsiensi ; multarumque societatum literarum socio.

"This remarkable work has never been published," wrote M. C. de Candolle recently, in reply to an inquiry sent from London, "owing to various circumstances which you will find fully stated in my grandfather's 'Mémoires et Souvenirs,' page 143." From this source part of the facts now to be presented, were taken, although the work is not so explicit as one could wish. Other published facts have been obtained from scattered sources, and for additional information I am indebted to M. Aug. de Candolle.

A strong friendship had sprung up between A. P. de Candolle, the first of that renowned family of botanists, and Adolph Hedwig, who was of about the same age, and at the time was professor of botany at Leipzig, having succeeded his father, the distinguished bryologist. It was in honor of the elder Hedwig that the journal *Hedwigia* was named. Hedwig, the younger, had begun a monograph of the ferns, and in exchange for specimens from the Antilles and elsewhere had sent to de Candolle an authentic set of mosses from the collection that had belonged to his father, which proved of great service in the revision of the Flore Française. An interesting correspondence ensued, carried on in Latin.

In the meantime Hedwig had prepared a work on the parasitic fungi, and as de Candolle says, "with a true talent." He desired to have this published in Paris and intrusted the manuscript to his very warm friend, A. P. de Candolle. It was placed in the hands of Garnery, who was issuing de Candolle's sumptuous work on succulent plants. For some reason Garnery did not take kindly to the new enterprise and delayed its beginning. De

Candolle says in his Mémoires that, not wishing to seem negligent to Hedwig, he asked Garnery to write to the author and state his reasons for the delay. This was promised, but not done. De Candolle became impatient, and threatened to give the publication of the succulent plants to some one else if he did not soon comply. Garnery was piqued at this, but de Candolle remained firm, and the publication of the succulent plants came to an end. Shortly afterward Garnery went into bankruptcy.

With what sanction de Candolle used the most important of Hedwig's deductions in his Flore Française, which appeared in 1805, we are not told. But the failure to secure the publication of this fine piece of work and stripping it of its scientific treasures did not interrupt the friendship, if we may trust the statement in the Mémoires. Shortly afterward, in July, 1806, Hedwig died. The work was subsequently placed in the hands of Guillemin, of Paris, but was never published.

It is a pity that so admirable a piece of scientific work should have met such an untoward fate. Even after a hundred years its publication would be a distinct gain to science.

Purdue University,
Lafayette, Indiana.

SHORTER NOTES

The Juncaceae of the West Indies. — Professor Buchenau contributed to the first volume of Professor Urban's Symbolae Antillanae an account of the Juncaceae hitherto known in the West Indies. He there records three species, *J. dichotomus* Ell., from Jamaica, a widely spread species in the eastern United States, *J. repens* Michx. from Cuba, also a species of the eastern United States, and *J. Guadeloupensis* Buchen. & Urb., a new species from Guadeloupe.

J. aristulatus Michx., another common species of the southeastern United States, may now be added to this list; it was collected by me in meadows at Sagua la Grande, Cuba, growing along the edges of small pools, September 4, 1903 (Britton & Wilson, No. 286). N. L. Britton.

AGDESTIS CLEMATIDEA Moç. & Sessé. — We found this beautiful white-flowered vine of Mexico and Central America in September climbing profusely over bushes on the playa of Matanzas, Cuba; it has evidently been cultivated in gardens there, but has made itself perfectly at home in the native tangles of shrubs and vines as a naturalized plant. The flowers and inflorescence are wonderfully Clematis-like, greatly resembling those of *Clematis Vitalba* of Europe and to a considerable degree those of our own *Clematis Virginiana*. But the most striking thing about the plant is its horrid odor, the flowers being, if anything, more fetid than those of the carrion-flower or skunk-cabbage, a fact which does not seem to be recorded in descriptions of the species. According to Professor Bailey, the vine has been cultivated in California. N. L. BRITTON.

A NEW STATION FOR ARABIS GEORGIANA. — On December 30, 1903, while walking along the Oostanaula River in Gordon County, Georgia, near Resaca, I came upon a considerable quantity of an *Arabis*, which by reason of its long erect pods, pubescence, mode of branching, and other characters observable at this season, can be no other than *A. Georgiana*, a species described in TORREYA last June, and known hitherto only from a single station on the banks of the Chattahoochee River in the coastal plain. The new station is in the Palaeozoic region, about 167 miles from the type-locality and almost due north of it. Its altitude is about 640 feet. The rock at this point is what has been called Oostanaula shale, and is of Cambrian age.

The habitats of the *Arabis* at the two stations are very similar, and many of the species accompanying it on the Chattahoochee also occur with or near it on the Oostanaula, among those which were recognizable being *Arundinaria macrosperma* Michx., *Hydrangea arborescens* L., *H. quercifolia* Bartr., *Platanus occidentalis* L., *Geum Canadense* Jacq., *Rhus glabra* L., *Acer saccharinum* L. (*A. dasycarpum* Ehrh.), and *Sassafras Sassafras* (L.) Karst. Some of these have rather a limited distribution in Georgia, and their occurrence together at two such widely separated localities is interesting. A visit to the new station in summer

would doubtless reveal a still larger number of species common to the two localities.

It would not be at all surprising if *Arabis Georgiana* should turn out to be more common in the hill country than in the coastal plain, for the genus *Arabis* (and in fact the whole family of Cruciferae) is mainly a northern one, and at the type-locality the species under consideration is associated with many species which do not range much farther south.

ROLAND M. HARPER.

GEOLOGICAL SURVEY OF GEORGIA.

NOTES ON EPIGEA REPENS L. — The lovely arbutus, as it is called in this region, is usually much sought after in the early spring when in flower. Even here, near our larger towns, it may disappear within a few years, if the wholesale collecting goes on.

It is a well-known fact that many of our spring flowers may be found in flower in the autumn, particularly many of our violets. The finding of *Epigea repens* in flower, October 14, 1895, was indeed a surprise ; and to others, to whom I have mentioned the fact. I became so much interested in this patch of plants, which grows under a white pine tree, in gravelly soil by a wagon road, that I have made observations yearly when possible or have had others do so. The plants in this patch never flower in the spring ! Near by are patches which are spring-flowering. The later dates of finding the arbutus in flower are : November 17, 1896 ; October 16, 1898 ; November 11, 1899 ; November 1 and December 3, 1900, September 24, 1903. The flowers are as well developed as any to be found in April, often tinged with pink and as deliciously fragrant.

Later in October, 1895, while climbing the Putnam Mountain range, south of Lake George, I found other patches of arbutus in flower ; but these hardly could have been located again, if I should have desired to make observations. Hundreds of patches in other parts of our area have been searched over in vain ; although well-developed flower buds are almost always present in the autumn. Why has this particular patch of plants taken to flowering in the autumn, rather than spring ?

VAUGHNS, NEW YORK. S. H. BURNHAM.

A new Lemanea from Newfoundland.—**Lemanea (Sacheria) borealis.** Sexual shoots evenly tufted, slender, 1–3 cm. or more long by 0.25–0.33 mm. in diameter: sterile base 0.5–1 cm. long, slender, gradually tapering into the fertile portion, the transition very rarely abrupt: antherid zone when young prominently tuberculate with 2–5 antherid papillae, these disappearing in age so that the older shoots are plane: procarp zone usually cylindrical, rarely constricted in the middle, sometimes slightly so near the apex, the result being that in age, with the disappearance of the antherid papillae, the shoots are nearly or quite cylindrical, the younger and middle-aged ones appearing slightly nodose: procarps arising in both the antherid zone and procarp zone, but not quite reaching the middle of the procarp zone: carpospores in tufts throughout the entire length of the shoot, not collected at the antherid zones as in *L. fucina* and its varieties, but not extending so closely to the middle of the procarp zone as in *L. fluviatilis*: carpospores elliptical to oblong, 25–45 μ × 18–25 μ: *Chantransia* stage represented only by fragments at season when collected, but threads 18–25 μ in diameter, cells 35–45 μ long, often slightly constricted at the septa: plants of a dull green color on drying, the spores sometimes showing a tinge of blue, and darkening, but not blackening the shoots: species of a parasitic *Chantransia* (*C. violacea*) sometimes present on the old shoots.

On rocks in a waterfall, Bay of Islands, Newfoundland, August 9, 1901, no. 1108. C. D. Howe and W. F. Lang.

These specimens agree with those collected by J. B. Fowler in Nepisiguit River, N. B.; and by J. Macoun in Pirates' Cove, Nova Scotia, and listed as small specimens of *Lemanea* (*Sacheria*) *fucina* Bory, var. *rigida* (Sirodot) on page 226 of my Monograph,* which forms should now be referred to this species.

George F. Atkinson.

Botanical Department, Cornell University.

REVIEWS

The Grass Family as treated in Urban's Flora of Porto Rico†

The great interest taken of late years in the flora of the West Indies has made the appearance of the initial parts of the Flora

* Monograph of the Lemaneaceae of the United States. Ann. Bot. 4: 177–229. *pl.* 7–9. 1890.

† **Urban, I.** Flora Portoricensis, Symb. Antill. 4: 76–109. 1903.

of Porto Rico, by Dr. I. Urban, a matter of considerable moment. The first instalment comes as fascicle I, Vol. IV, of his Symbolae Antillanae, and treats of the Pteridophyta, and of the Spermatophyta as far as the Chloranthaceae. The grass family is naturally the one of especial interest to the reviewer, the more so as he published a few months ago a preliminary enumeration of the grasses of the same region, basing his work upon the material in the herbaria of the New York Botanical Garden.

The material for the work here reviewed has been determined in the main by Professor E. Hackel, but some few of the genera have been revised by other students of this family: *Arundinella*, *Cenchrus*, *Aristida*, *Bouteloua*, *Leptochloa*, *Phragmites* and *Eragrostis* by Dr. Pilger; and *Panicum* and *Paspalum* by Dr. Mez.

That this work will be of great value to students of the grasses of the West Indies, it is hardly necessary to state. There are accredited to the island 38 genera and 125 species, with a few subspecies and varieties. This must represent a large proportion of the entire grass flora of the island, and the size of this list but emphasizes a marked deficiency in the work, the entire absence of keys of any kind, not alone to the species, but also to the tribes and genera. This want seriously curtails the usefulness of the work to any but specialists and is to be the more regretted, as it is but intensified by contrast with other admirable features, notably the full citation of synonymy, localities, and specimens.

In the matter of nomenclature, the work is for the most part up to date, and carried along on consistent lines, but one cannot but note such exceptions as these, and wonder at their retention: *Setaria* and *Leersia*, homonyms, are maintained, and *Chaetochloa* and *Homalocenchrus*, both available, are reduced to synonymy; and *Eriochloa* Kth., although published three years later than *Monachne* Beauv., is preferred to that genus.

In the matter of generic limitations a conservative course has been pursued, and as conservatism is often but another name for tradition, inconsistencies have crept in here and there. This is especially noticeable in the treatment of the Paniceae. Here *Chaetochloa* Scribn. (*Setaria* Beauv., as they persist in calling it, although

a homonym) and *Isachne* are held as distinct from *Panicum*, while *Syntherisma* and *Echinochloa*, equally as valid genera, are merged in that polymorphic receptacle *Panicum*; and again, *Paspalum*, the line between which and *Panicum* is so frail at times as to be all but lost, is maintained, and is also made to include *Anastrophus*, which certainly is as distinct from *Paspalum* as that genus is from *Panicum*.

Most of the species published by the writer in his recent enumeration of the grasses of this same region * have been maintained in this work. In some instances, however, these have been reduced to synonymy. As in one instance this is due apparently to a misunderstanding of the species involved, I cannot refrain from entering into it quite in detail. I refer to the reduction of my *Paspalum Underwoodii* to the synonymy of *Paspalum lentiginosum* Presl. It is difficult to understand how any one who has read the original description of *P. lentiginosum* can come to the conclusion maintained in the work under consideration, for *P. Underwoodii* is in no way related to that species. Presl's species was described from material collected in Mexico, a country from which I have not seen a specimen of *Paspalum Underwoodii*, which, so far as I know, is confined to the West Indies. In the tenth annual report of the Missouri Botanical Garden, in an article by Professor Scribner on the grasses of Haenke in the Bernhardi Herbarium, will be found a discussion of this species of Presl. Among these Haenke specimens was one labeled in Presl's handwriting, *Paspalum lentiginosum*, and from this a drawing was made, of which Plate 13 in the report referred to above is a reproduction. Professor Scribner states that Palmer's no. 1556, collected at Culiacan, Mexico, in 1891, is the same as this, and certain it is that this specimen agrees closely with Presl's description and with the plate referred to above. Haenke's American specimens were from the Pacific coast, and Culiacan is on the west coast of Mexico. *Paspalum lentiginosum* Presl is clearly related to, if not identical with, *P. hemisphaericum* Poir., a relationship fully expressed in Urban's Flora by placing the two in juxtapo-

* A preliminary Enumeration of the Grasses of Porto Rico. Bull. Torrey Club, 30: 369–389. 10 Jl 1903.

sition, but unfortunately the specimens cited at that place do not belong there, but are *Paspalum Underwoodii*, a quite different plant, and a relative of *P. densum* Poir., a fact which I distinctly pointed out when publishing *P. Underwoodii*.

Another inaccuracy is in making my *Paspalum Hitchcockii* synonymous with *P. glabrum* Poir. The writer saw the type of the latter species at Paris, and it is a much more slender plant with smaller and glabrous spikelets.

But perhaps the most curious case of reduction is by Dr. Urban himself when he makes my *Monachne subglabra* a variety of *Eriochloa punctata*. No reason is given for this unless it be the words placed in parentheses, "non vid."

Three new species are described, all by Dr. Pilger: *Aristida Portoricensis*, *Eragrostis macropoda* and *Arthrostylidium sarmentosum*. One of these, *Eragrostis macropoda*, must be reduced to synonymy, for it is the true *Poa nitida* Ell., Dr. Pilger's remarks to the contrary notwithstanding. This is unfortunate, for the name *macropoda* is most appropriate, as the distinguishing feature is the long peduncle of the spikelets, a character mentioned by Elliott likewise when describing his *Poa nitida*; moreover, there is in the herbarium of Columbia University a specimen from Elliott, labeled in his own handwriting *Poa nitida*, which agrees with his own description of that species, so that the question is thereby taken out of the realm of uncertainty. Dr. Pilger remarks in a note that in *Eragrostis nitida* (*Poa nitida* Ell.) the spikelets are almost sessile, a statement clearly at variance with the facts, as pointed out above. There is a species with almost sessile spikelets, closely related to this, and inhabiting the same region, and it is probably this which Dr. Pilger has mistaken for the true *Poa nitida* Ell. I refer to the *Poa refracta* Muhl. [*Eragrostis refracta* (Muhl.) Scribn.].

The work is a welcome addition to the literature bearing upon the grasses of the West Indies, for it brings together in a concise manner a large proportion of the species found in that region, and for this a grateful appreciation and congratulations are extended.

George V. Nash.

PROCEEDINGS OF THE CLUB

Tuesday, January 12, 1904

The Club was called to order at the usual hour, Dr. Rusby occupying the chair. There were sixteen members present. This being the annual business meeting, no scientific program was presented.

Dr. Philip Dowell, 14 Albion Place, Port Richmond, Staten Island, and Mr. F. W. Kobbe, 142 East 18th street, New York City, were elected active members.

The next order of business was the report of officers and committees. The recording secretary read his report, showing 15 regular meetings held during the year, with an average attendance of 20. The number of active members elected was 14, corresponding members 2, resignations 12, deaths 2, thus leaving the active membership unchanged at 238, as shown by previous secretary's report. The number of papers and communications presented was 41. The report was accepted, but it was pointed out that the number of active members indicated was probably too large.

The treasurer read a preliminary report, which was received and referred to an auditing committee consisting of J. H. Barnhart, M. A. Howe and F. S. Earle. This committee was instructed to audit the completed treasurer's report and to investigate the general financial condition of the Club and to report at the next meeting.

The editor-in-chief presented a report showing that owing to lack of funds no volume of the *Memoirs* had been published. The volume of the *Bulletin* comprises 709 pages and 30 plates, with numerous text illustrations. The cost has exceeded the estimate made at the beginning of the year by only about $12. Eight meetings of the editorial board were reported. The publication of the issues earlier in the month has been secured. Certain changes, including a new cover design, have been adopted for 1904. The burden of preparing the index to current literature has been assumed solely by the editor-in-chief. The report was accepted.

The finance committee made a verbal report.

The editor of TORREYA made a verbal report which was accepted.

The committee on local flora made a verbal report outlining the work done during the year and calling special attention to the need of much more active and critical work on the local flowering plants, and especially on the cryptogams, many groups of the latter having been almost entirely neglected.

The next order of business was the election of officers. By a unanimous vote the secretary was instructed to cast the ballot of the Club for the reëlection of all the present officers, which was done and their election was declared.

On motion, the editor-in-chief and two other members of the editorial board to be selected by him were appointed a special committee to endeavor to place the publications of the Club in various libraries of public institutions where they are not now to be found.

A communication was read from the Outdoor Art League of California in regard to legislation now pending in Congress for the preservation of the Calaveras Grove of Big Trees, asking the endorsement of the Club for this measure. On motion the following resolution was adopted :

Resolved: That the Torrey Botanical Club heartily endorses the action of the Outdoor Art League of California in trying to secure legislation for the preservation of the Calaveras Grove of Big Trees, and that it hereby urges the favorable consideration of such legislation by Congress.

There being no further business, adjournment followed.

F. S. EARLE,
Recording Secretary.

NEWS ITEMS

The Botanical Gazette announces, with a regret which must be generally felt, that the *Journal of Applied Microscopy and Laboratory Methods* will cease publication with the issue for December, 1903.

Mr. Otto E. Jennings, of the Ohio State University, has been appointed custodian of the botanical collections at the Carnegie

Museum, Pittsburgh, Pa., succeeding Mr. J. A. Shafer, now of the New York Botanical Garden.

We note in *Science* that Mr. E. W. D. Holway, of Decorah, Iowa, the well-known student of the Uredineae, has given his valuable botanical library and his extensive collections of fungi to the University of Minnesota.

The ninth annual winter meeting of the Vermont Botanical Club was held at Burlington, January 21 and 22. Twenty-four papers were presented. The annual address was given by Marshall A. Howe, of the New York Botanical Garden, under the title of "The Plant Life of the Sea," with lantern-slide illustrations. The attendance at the various sessions of the meeting ranged from about fifty to two hundred. Under the able leadership of President Ezra Brainerd and Professor L. R. Jones, this has grown to be one of the most active and enthusiastic botanical clubs in the United States.

Botanical visitors in New York City since October 20, 1903, not already mentioned in TORREYA, include Professor A. S. Hitchcock, of the Bureau of Plant Industry, Washington, D. C.; Dr. C. F. Millspaugh, Field Columbian Museum, Chicago; Dr. J. W. Blankinship, Montana Agricultural College, Bozeman, Mont.; John G. Jack, Arnold Arboretum, Jamaica Plain, Mass.; Charles Louis Pollard, Springfield, Mass.; Professor Henry L. Bolley, Agricultural Experiment Station, Fargo, North Dakota; Dr. Edgar W. Olive, Harvard University; Dr. Antonio Vaccari, Royal Italian Navy; Dr. John L. Sheldon, West Virginia University, Morgantown, W. Va.; Professor William C. Coker, University of North Carolina, Chapel Hill, N. C.; President Ezra Brainerd, Middlebury College, Middlebury, Vt.; Mr. H. L. Everett, São Paulo, Brazil; and Professor Alexander W. Evans, Yale University, New Haven, Conn.

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TORREYA

March, 1904

A SUMMER IN SALISBURY, CONNECTICUT

By A. Vincent Osmun

Occupying the northwest corner of Connecticut, the town of Salisbury is bordered on the west by New York State and on the north by Massachusetts. Mountains and valleys, lakes, swamps and brooks innumerable combine to make this not only a region of great natural beauty, but to the botanist one of the richest hunting grounds in southern New England. Here we find Connecticut's highest point of land, Bear Mountain, rising 2,355 feet above the level of the sea, while Lakes Washining and Washinee, "the twin lakes of the woods," and Lake Wononscopomuc are among her largest and most beautiful sheets of water. Along the eastern border of the town flows the Housatonic River. There are deep, cold, almost inaccessible swamps, and the botanist who has courage to penetrate their depths surely finds his reward.

In this region it was the writer's good fortune to spend the greater part of the summer of 1903. A number of plants hitherto unreported as growing in Connecticut were collected, together with many rare or unusual in other parts of the State. That Salisbury should have a flora so different from other parts of the State is probably due to the generally higher altitude, there being few points in the town below 600 feet, while at least ten peaks rise above 1,400 feet.

Our collecting was confined chiefly to a large estate in the northern part, comprising about one thousand acres of land typical of the whole town, though a few of the plants here mentioned were not found within this area. The summer's collecting by no means represents the complete flora of this region, but the following seem to deserve especial mention at this time:

[Vol. 4, No. 2, of Torreya, comprising pages 17–32, was issued February 25, 1904.]

Botrychium neglectum Wood. This species is abundant in leaf-mould on the wooded mountain slopes.

Pellaea atropurpurea (L.) Link is commonly met with on limestone ledges by roadsides. Fronds fourteen to sixteen inches long frequently are found.

Asplenium Ruta-muraria L. A ledge of limestone and gneiss fully one third of a mile long is literally covered with this dainty little fern. No other stations were found.

Filix bulbifera (L.) Underw. is mentioned because of its great abundance. Not only is it found upon limestone and other ledges, but in many places where one naturally would not look for it.

Pinus resinosa Ait. One tree found at an altitude of about 1,300 feet. This is several miles from the station reported in Bishop's list of Connecticut plants, which, we are informed, was over the line in New York State.

Picea Mariana (Mill.) B.S.P. A large number of trees, varying in size from seedlings to a foot or more in diameter at the base, were found at an altitude of about 2,000 feet.

Sparganium minimum Fries. The first known station in Connecticut was found in Lake Washinee.

Poa nemoralis L. The finding of this grass in Salisbury extends the range south from northern New England.

Sagittaria graminea Michx. was found thickly established in mud on the edge of Lake Washinee, where it is crossed by the C. N. E. R. R.

Cypripedium reginae Walt. grows abundantly in some of the more inaccessible swamps. This most beautiful of the lady's-slippers is gathered in great bunches by residents and is in danger of extermination.

Achroanthes monophylla (L.) Greene. A few plants found in a damp hemlock grove. No other station is known in Connecticut.

Corallorhiza multiflora flavida Peck. Three plants were found, one of which was deposited in the herbarium of the New York Botanical Garden. This variety has been observed only in New York State, and in 1903 in Maryland.*

* Waters, C. E. Plant World, 6: 264.

Arenaria Michauxii (Fenzl.) Hook. f. is very common on limestone ledges.

Mitella nuda L. was first reported from this state in 1903.* It is abundant in several wooded swamps.

Lepidium sativum L. was found in a chicken yard and probably was introduced in grain.

Reseda lutea L. is frequent in fields and waste places.

Gentiana quinquefolia L. Though this cannot be termed a rarity, the extraordinary numbers of plants found growing in and about Salisbury, seem to entitle it to special mention. Except two stations it seems to be confined to Litchfield County, and so far as the writer has observed is nowhere else so abundant.

Houstonia longifolia Gaertn. Only one plant was found in a dry field, diligent search failing to reveal others.

Lobelia Kalmii L. is another plant generally rare in other parts of the state, which here is very common in damp places, whole pastures sometimes being blue with it.

Petasites palmata (Ait.) A. Gray has not before been reported south of Massachusetts. It was frequently met with in a cold, wooded swamp, but no flowers were found.

Among the less noteworthy plants collected are the following: *Cinna latifolia* (Trev.) Griseb. *Avena striata* Michx. *Andropogon curtipendulus* (Michx.) Fourn. *Poa debilis* Torr. *Poa alsodes* A. Gray. *Panicularia acutiflora* (Torr.) Kuntze. *Streptopus amplexifolius* (L.) DC. *Betula pumila* L. *Sibbaldiopsis tridentata* (Soland.) Rydb. *Comarum palustre* L. *Oxalis Acetosella* L. *Rhamnus alnifolia* L'Her. *Moneses uniflora* (L.) A. Gray. *Blephilia ciliata* (L.) Raf. *Utricularia minor* L. *U. gibba* L. *U. cornuta* Michx. *Hieracium Marianum* Willd.

Credit is due to Mrs. O. A. Phelps for the discovery of many of the above-listed specimens.

Most of the plants mentioned are to be found in the herbarium of Grasslands, belonging to Robert and Herbert Scoville, Salisbury (P. O. Chapinville), Connecticut.

Amherst, Massachusetts.

* Phelps, O. A. "An Hour in a Connecticut Swamp," Rhodora, 5 : 196.

THE SLIME-MOULDS OF PENNSYLVANIA

By D. R. Sumstine

Of the 200 or more species of slime-moulds recognized in the United States, 103 or about one half have been reported from Pennsylvania. No doubt this number will be largely increased when the state is thoroughly explored.

The following list is necessarily incomplete but it provides a basis for future investigation of this interesting flora.

Arcyria cinerea (Bull.) Pers.*
denudata (L.) Sheld.*
digitata (Schw.) Rost.†
incarnata Pers.*
incarnata nodulosa Macbr.†
magna Rex ‡
nutans (Bull.) Grev.*
Oerstedtii Rost.†
Badhamia decipiens (Curt.) Berk.†
lilacina (Fr.) Rost.†
macrocarpa (Ces.) Rost.†
orbiculata Rex ‡
papaveracea B. & R.†
Brefelda maxima (Fr.) Rost.*
Clastoderma Debaryanum Blytt.†
Comatricha aequalis Peck †
longa Peck †
nigra (Pers.) Schroet.†
Persoonii Rost.†
pulchella (Bab.) Rost.†
Craterium aureum (Schum.) Rost.†
Craterium leucocephalum (Pers.) Ditm.†
Cribraria argillacea Pers.†
aurantiaca Schrad.*
dictydioides Cke. & Balf.†
elegans B. & C.†
intricata (Schrad.) Rost.†
microcarpa (Schrad.) Pers.†
minutissima Schw.†
purpurea Schrad.†
tenella Schrad.†
violacea Rex ||
Diachea leucopoda (Bull.) Rost.*
splendens Peck †
Dictydiaethalium plumbeum (Schum.) List.*
Dictydium cancellatum (Batsch) Macbr.*
Diderma cinereum Morg.†
crustaceum Peck*
reticulatum (Rost.) Morg.†
stellare (Schrad.) Pers.†

* Specimen in the writer's herbarium,
† Macbride, North American Slime Moulds.
‡ Proc. Acad. Nat. Sci. Philadelphia, 1893.
§ Proc. Acad. Nat. Sci. Philadelphia, 1891.
|| Proc. Acad. Nat. Sci. Philadelphia, 1889.
¶ Proc. Acad. Nat. Sci. Philadelphia, 1890.

Didymium Clavus (A. & S.) Rabenh.†
Enerthenema papillata (Pers.) Rost.†
Enteridium splendens Morg.*
Fuligo ovata (Schaeff.) Macbr.*
violacea Pers.*
Hemitrichia clavata (Pers.) Rost.*
intorta List.*
serpula (Scop.) Rost.*
stipitata Mass.*
vesparium (Batsch) Macbr.*
Lachnobolus globosus (Schw.) Rost.*
Lamproderma arcyrionema Rost.†
columbinum (Pers.) Rost.†
scintillans (B. & Br.) List.†
violaceum (Fr.) Rost.†
Leocarpus fragilis (Dicks.) Rost.*
Lepidoderma tigrinum (Schrad.) Rost.†
Licea minima Fr.†
variabilis Schrad.†
Lycogala conicum Pers.*
epidendrum (Buxb.) Fr.*
Mucilago spongiosa (Leyss.) Morg.*
Oligonema brevifila Peck †
Ophiotheca Wrightii B. & C.†
Orcadella operculata Wing.§
Perichaena marginata Schw.†
quadrata Macbr.†
Physarella oblonga (B. & C.) Morg.†
Physarum atrum Schw.†
Physarum caespitosum Schw.†
contextum Pers.†
ellipsosporum Rost.*
galbeum Wing.†
lateritium (B. & Br.)Rost.†
leucophaeum Fr.†
leucopus Link *
nefroideum Rost.†
nucleatum Rex ||
obrusseum (Berk. & Curt.) Rost.†
penetrale Rex ||
psittacinum Ditm.†
pulcherrimum B. & R.†
rufipes A. & S.†
serpula Morg.†
virescens Ditm.†
Stemonitis fenestrata Rex ¶
fusca (Roth) Rost.†
maxima Schw.*
Morgani Peck *
nigrescens Rex ||
pallida Wing.*
Smithii Macbr.*
Webberi Rex *
Tilmadoche compacta Wing.§
viridis (Bull.) Sacc.†
Trichia botrytis Pers.†
decipiens (Pers.) Macbr.*
favoginea (Batsch) Pers.*
inconspicua Rost.†
persimilis Karst.†
scabra Rost.*
varia (Pers.) Rost.*
Tubifera ferruginosa (Batsch) Macbr.*

Specimens of the above species can be found in the Rex collection in the Academy of Natural Sciences, Philadelphia, in the Wingate collection now in the possession of Prof. Thomas H. Macbride, Iowa City, or in the writer's collection.

Dr. George A. Rex and Mr. Harold F. Wingate collected extensively in southeastern Pennsylvania, especially about Philadelphia. The writer has collected in Clarion, Armstrong and Westmoreland counties.

The nomenclature in Macbride's North American Slime-Moulds has been followed. Our thanks are due to Prof. C. H. Peck for identifying one species, *Dictydiaethalium plumbeum*.

KITTANNING, PA.
December 14, 1903.

THE CRATAEGI OF FORT FREDERICK, CROWN POINT, NEW YORK

BY W. W. EGGLESTON

Two miles across Bulwagga Bay from Port Henry are the ruins of Fort Frederick. Crown Point is a long tongue of clay underlaid with limestone; this is a typical place for the growth of Crataegi, lime appearing to be one of the essentials in the best development of the plant. The limestone soils of the Champlain and the St. Lawrence valleys show a wonderful development of the genus in numbers and variety and they follow so closely the limestone outcrops that one cannot help feeling that there are lime components in the soil wherever he finds Crataegi.

Our first attention was called to the thorns of Fort Frederick by F. H. Horsford in July, 1899. He had visited the Fort a few days before and although having but a few minutes to spare found six forms. This at a time when Vermont was known to have but five forms, was very surprising to us; now that we know nearly one hundred forms in Vermont we should not be so easily moved.

We have more than doubled Horsford's number and with more careful search will very likely find more. But the variety

of forms is not of so much interest to us, for we have several smaller areas in western Vermont where there are more than twenty forms ; we are more interested in the large tract practically given up to thorns. The grounds about the Fort and much of the rest of the Point are pastured and most of this region is a great thorn orchard and in many places a dense thorn thicket.

One is surprised to find the dominant species the southern *Crataegus Crus-galli* L., known in New England only at a few stations in Connecticut and along Lake Champlain in Vermont.

The northern *Crataegus coccinea rotundifolia* Sarg. is also abundant.

As yet none of the group *Tenuifoliae*, the most common in New England, has been found there. All of the forms in the following list the writer has seen growing there excepting those accredited to Professors Brainerd, Peck, and Sargent.

Crataegus Champlainensis Sarg.; *C. coccinea* L., *C. H. Peck ; C. coccinea rotundifolia* Sarg.; *C. Crus-galli* L.; *C. exclusa* Sarg., *C. H. Peck ; C. flabellata*, Spach ; *C. Holmesiana* Ashe, *Brainerd* and *Sargent ; C. lobulata*, Sarg.; *C. macracantha* Kochne (also a hairy form) ; *C. praecoqua* Sarg.; *C. Pringlei* Sarg.; *C. pruinosa* Beadle ; *C. punctata* Jacq.; *C. submollis* Sarg. (?) *C. H. Peck.*

SHORTER NOTES

Crataegus Porteri Britton. — Abundant flowering specimens and ripe fruits of this species (described in Bulletin of the New York Botanical Garden, 1 : 448) recently received from Mr. Wm. M. Canby who has visited the region about Tannersville, Pa., where the type specimen was collected by me in 1896, enable me to supply the following supplementary description of the plant :

A tree 6.5 m. high or less, with long flexuous straggling branches and a short trunk 1.5–2 dm. thick, with light-colored and smooth bark. Leaves thickish, very smooth, rounded or abruptly tapering at the base, acute, with two or three sharp lobes on each side : cymes few-flowered, about 4 cm. broad ;

bracts narrow, glandular; pedicels 1–2 cm. long, glabrous; stamens about 20, with white anthers: pome pyriform up to the time of ripening, when fully ripe obovoid to spherical, but often drying pyriform, a little more than 1 cm. in diameter and a little longer than thick, dull red with green blotches.

The tree flowers about the middle of May, and the fruit ripens in early October.

According to Mr. Canby's observations, the plant is not uncommon in the vicinity of Tannersville.

N. L. Britton.

REVIEWS

The Desert Botanical Laboratory of the Carnegie Institution*

This volume contains the report of the advisory board, consisting of Mr. F. V. Coville and Dr. D. T. MacDougal, which was appointed to investigate the selection of a site for the Carnegie Desert Laboratory in the arid regions of the West. The report will be of unusual interest to botanists, not only because it deals with one of the most important botanical departures in this country and promises results of the highest biological importance, but also because the authors have given sufficient knowledge of the flora and conditions prevailing in these arid belts to reveal the wealth of material afforded for physiological and geographical study. The majority of botanists have not had the opportunity of visiting the areas covered by the report and to such and to people in general the diversity of climate, topography, mechanical, chemical and physical conditions which obtain in these desert districts will come with something of surprise. The information concerning the areas and distribution of these arid regions in the Chihuahua and the Sonora-Nevada desert belts, which occupy more than a million square miles of plateaus and plains east and west of the main Cordilleran ranges together with data upon the meteorology and other conditions controlling plant-life in these areas is an important supplement to the meager and often misleading current information upon this subject.

* Carnegie Institution of Washington, Publication, No. 6. Pp. i–vi, 1–58. *pl.* 1–39 + *f.* 1–4. "N 1903." [Issued J 1904.]

The committee in performing its work visited all the more important arid districts in the west, noting the character of the vegetation, and physical and soil conditions. This led them first into the siliceous sand hills of Chihuahua, Mexico, and thence to the drifting alkaline sand fields of the Tularosa Desert of New Mexico, which cover an area of about 10 by 40 square miles. From the extensive arid country about Tucson, Arizona, with its rich flora and varied conditions, they proceeded into the province of Sonora, Mexico, giving an interesting account of the vegetation and the remarkable associations of forms occurring at Torres and especially at Guaymas. Continuing westward, detours were made at several points in the Colorado Desert, revealing the extreme diverse topographical and soil conditions which vary from mountains and hills to salt and alkali flats and sand-swept plains. The exploration ended with a journey through the Mohave Desert, concerning which Mr. Coville has given a very comprehensive report in the Botany of the Death Valley Expedition, and a trip to the Grand Canyon of the Colorado. The selection, as a result of this survey of the field, of Tucson, Arizona, as a site for the laboratory cannot be criticized. It is situated on one of the great transcontinental lines, rendering it easily accessible and the city of Tucson will furnish a convenient and satisfactory base of supplies. In addition to this the large arid belt in this region presents a typical desert flora and with such a diversity of conditions that it is exceptionally rich in woody and annual species. It is to be hoped that the laboratory may not only furnish facilities for the investigation of plant life in the country adjacent to Tucson, but that it may have as one of its functions the equipment of expeditions to the numerous promising districts noted in the report.

The value of the report has been greatly enhanced by the introduction of thirty-nine illustrations of desert views. It is safe to say that these are the most remarkable scenes of desert plant-life that have ever been published. They bring very vividly before us the character of the vegetation and the atmosphere of the region.

The Desert Botanical Laboratory of the Carnegie Institution is to be congratulated on having so favorable an introduction to the public.

CARLTON C. CURTIS.

Lexicon Generum Phanerogamarum *

Under this title has recently appeared a work which presents, in concentrated form, the results of a vast amount of careful and thorough work. There are here brought together, within the the compass of 750 octavo pages, an elaborate code of nomenclature, a complete enumeration of the genera of flowering plants proposed from 1737 to 1902 (and a few in 1903), and a systematic arrangement of all those recognized as valid. It was obviously impossible for the authors to include full citations, but the date of publication is mentioned whenever it is of importance.

According to the title-page, the author is Tom von Post, the director of the seed-testing station at Upsala, and no doubt much of the value of the compilation is due to his labors; but there is the further statement "opus revisum et auctum ab Otto Kuntze," and to a person familiar with Dr. Kuntze's productions, his impress is discernible upon every page. His connection with the work lends to it a certain stamp of reliability which it would not otherwise possess, yet his unique view-point makes it impossible for any well-informed botanist to accept the results as in any manner authoritative.

Radical as are his views regarding nomenclatural reform, there is perhaps no more conservative living botanist than Dr. Kuntze, when it comes to the recognition of genera. This work admits only 8,333 genera of living phanerogams, while at Kew, where the influence of Bentham & Hooker's masterpiece has led to what is commonly regarded as extreme conservatism, the number recognized is not far from 9,000; the number allowed by the exponents of the Englerian system is nearer 10,000; and the principles followed by many continental and most American botanists would result in the recognition of a much larger number. The reduction in the number of genera is readily understood when we observe that all the genera of Cacteae recognized by recent monographers are reduced to a single genus, *Cactus*; incidentally it may be remarked that this treatment obviates the necessity of determining to which of the component genera the

* Post, T. v. & Kuntze, O. Lexicon Generum Phanerogamarum, inde ab anno MDCCXXXVII. i–xlviii, 1–714. Stuttgart, 1904.

Linnaean name *Cactus* should be applied. The expression of such erratic views of classification in a nomenclator intended for general use is unfortunate, almost as much so as the peculiar results which spring from the application of the code of nomenclature adopted as a basis for the work.

This code, termed by Dr. Kuntze his "Codex brevis maturus," and intended for presentation at the Vienna Congress in 1905, was published in advance of the Lexicon, with commentaries, from which extracts have already appeared in TORREYA.* By a happy inspiration, these "inevitably polemic" commentaries are here omitted, with the explanation that they "shall not be inserted into the Lexicon to make it free from polemic . . . anyone who likes polemic can easily buy it." The chief characteristics of the code which affect the nomenclature of the Lexicon are the adoption of the year 1737 as the starting-point for genera, and the freedom with which the spelling of generic names has been revised in accordance with elaborate and more or less arbitrary rules of orthography.

The Codex is marred by the presence of frequent index figures, referring to the missing commentaries. It is printed in German, French and English, in parallel columns, the English version being expressed in the quaintly picturesque phraseology for which Dr. Kuntze is famous. For instance, there are provisions "to insure an uniform orthography and clear coördination of corrected homonyms instead of distant incorrected-ones, and to avoid the validity of several homonyms only differing by inequal orthography," and among the provisions for the representation of botanical societies in international congress, is one to the effect that "these votes can only be represented by one or more orderly members of each society!"

Typographically, the work is remarkably free from errors. The accepted genera are brought out clearly by the use of boldface type, but the data accompanying these bold-face names run together with the cross-references in an annoying way that could easily have been avoided by the judicious use of italic.

This is not the place for an extended discussion of the peculiar nomenclatural views of Dr. Kuntze, as expressed in his latest

* TORREYA, 3: 154–157. © 1903.

code. Suffice it to say that he has few, if any, supporters in America, and it is doubtful whether he has any in Europe. Possibly the vituperation poured upon all who disagree with him has prevented his ideas from receiving as serious consideration as they deserve. It is certainly unfortunate that he should regard himself as an infallible referee upon all points in dispute, and hurl anathemas at all who refuse to acknowledge his authority, characterizing their propositions as "dishonest," "inexecutable," "false" and "lawless." JOHN HENDLEY BARNHART.

PROCEEDINGS OF THE CLUB

WEDNESDAY, JANUARY, 27, 1904

This meeting was held at the New York Botanical Garden with Professor Underwood in the chair; thirty persons were present.

The treasurer's report deferred from the last meeting was read and also that of the auditing committee.

The report of the auditing committee showed that there were 194 active members at the time of the last meeting, January 12.

The editor-in-chief as chairman of the committee for securing increased sale of the publications of the Club announced Miss Vail and Dr. Howe as the other members of the committee.

The following resignations of members of the Club were read and having been approved by the treasurer were accepted: Miss Amy Schussler, Mr. Ewen MacIntyre, Mr. Marshall Bright, Dr. Alexander P. Anderson, Miss E. W. Kornman, Dr. L. Schoeney and Mr. E. G. Buttrick.

The announcement was made that President Brown had reappointed all the standing committes with the same membership as last year, viz.,

Committe on Finance: H. H. Rusby, J. I. Kane, C. F. Cox.

Committee on Admissions: E. S. Burgess, Delia W. Marble, J. K. Small.

Committee on Local Flora:

Spermatophytes: N. L. Britton, E. P. Bicknell, H. H. Rusby, Fanny A. Mulford.

Cryptogams: L. M. Underwood, M. A. Howe, Elizabeth G. Britton.

Committee on Program: N. L. Britton, M. A. Howe, L. M. Underwood.

Committee on Field Excursions: Eugene Smith, G. V. Nash, Miss M. L. Sanial, Miss L. K. Lawall, E. W. Berry.

The first paper on the scientific program was by Dr. J. K. Small on "Some recent Explorations in southern Florida." Dr. Small was accompanied on his trip by Mr. J. J. Carter of Pennsylvania and for a part of the time by A. A. Eaton, who paid special attention to the orchids and ferns. From Miami as a base, expeditions were made in different directions. One trip was made to the northward in the direction of Ft. Worth. Four strikingly different plant formations were noted in this region: (1) sand ridges covered with gnarled and stunted trees and shrubs mixed with cacti with almost no grass or herbaceous vegetation; (2) low-lying moist lands covered with grasses and sedges but destitute of trees and shrubs; (3) the pine lands; and (4) the hammocks filled with broad-leaved evergreens and deciduous trees. The country south of Miami is just being opened up to settlement and is still in a primitive condition. Most of the excursions were in this direction, explorations being made for a distance of 45 miles. The region consists of low coral-limestone ridges with no appreciable soil but still supporting a dense pine forest. The lower levels are filled with water and constitute arms of the everglades. The pine lands are interspersed with occasional small hammocks. An exceedingly interesting flora was found, and over a thousand numbers were collected, which include an unusual proportion of new and interesting things. So far as the collections have been studied the plants from the hammocks show a close relationship to the Cuban flora and include a considerable number of West Indian species not heretofore known from the mainland. The pineland species on the contrary are largely endemic and include many undescribed species.

In the discussion which followed the reading of the paper it was stated that the expedition would probably add at least a hundred species to the known flora of the United States.

The second paper was by Dr. J. C. Arthur on "An interesting unpublished Work on the Fungi." This paper was printed in the issue of TORREYA for February.

The third paper was by Dr. N. L. Britton on "The Birch Trees of North America." Recent study in arranging the dendrological exhibit in the Museum, has shown the necessity for a further investigation of our arborescent flora. In some genera, notably in *Fraxinus*, too many species are now recognized and some reductions will be necessary. In the birches on the contrary, it is necessary to recognize at least four new species. One of these is in the Alleghany region, and the others are northwestern.

F. S. EARLE,
Recording Secretary.

FEBRUARY 9, 1904

The following persons were elected to active membership: Miss Margaret H. Stone, 254 West 93rd St., N. Y. City; Miss L. A. C. Howard, University Heights, N. Y. City; Miss Marion E. Latham, 417 West 148th St., N. Y. City; Miss Aurelia B. Crane, Scarsdale, Westchester Co., N. Y.

The committee on field excursions presented its annual report for 1903. It was received and ordered placed on file with the minutes.

The first paper on the scientific program was by Mr. Homer D. House on "The Influence of some Aluminium Salts on Plant Growth." The paper was a preliminary report on some experiments with aluminium sulphate, aluminium potassium sulphate, aluminium nitrate and aluminium chloride to test their effect on plant growth when used in very weak solutions of varying strength. The seedlings of *Lupinus albus* were used in these tests as being best adapted to the purpose on account of their rapid vigorous growth and also because they have been previously used in similar tests with other toxic salts. The results obtained with all four of these salts were entirely parallel but those with aluminium sulphate were most marked. All were very poisonous and entirely inhibited growth till very dilute solutions were reached. When the point of dilution was reached

that permitted growth to take place, it still greatly retarded it. With further dilution the amount of retardation decreased until a point was reached when the action became stimulative and the rate of growth was considerably above the normal. This was to be expected, as sufficiently dilute solutions of many toxic salts are known to have a stimulating effect on plant growth. With still more dilution the stimulative effect became less marked until the normal rate of growth was again reached. Very unexpectedly, however, it was found that when dilutions were carried still further, instead of remaining at the normal, a distinct retardation of growth was again observed. As the dilution still increased another point was reached where the effect was stimulative though less strongly so than in the first case. Some of the series of dilution cultures showed as many as three distinct succeeding waves of depression and stimulation following each other with decreasing strength. Further experiments in this interesting field are in progress.

The second paper was by Mr. G. V. Nash on "A Collecting Trip to Haïti." It was illustrated by a large number of photographs and herbarium specimens and gave a graphic account of the experiences of a botanical collector in this interesting but little known country. The difficulties of travel are very great. No one is allowed to travel in the interior at all without thoroughly satisfactory letters to the authorities. Even with government permission secured, no accommodations for the white traveler could be found except for the unfailing hospitality of the priests, who are nearly all educated Frenchmen. They are very often the only white men in their districts.

The flora of the sea-shore is much the same as in the other West Indies, but as one goes toward the interior the character of the vegetation soon changes and a large proportion of interesting endemic species is found.

F. S. Earle,
Recording Secretary.

NEWS ITEMS

Professor F. S. Earle, of the New York Botanical Garden sailed on February 25 for a few weeks' visit to Cuba.

Dr. William C. Sturgis, formerly mycologist of the Connecticut Agricultural Experiment Station, has been appointed lecturer on botany in Colorado College, Colorado Springs.

Dr. C. J. Chamberlain of the University of Chicago started for Mexico late in February to obtain material for use in his study of the spermatogenesis, oögenesis, and fertilization of the cycads *Dioon* and *Ceratozamia*.

Dr. H. N. Whitford, of the University of Chicago, is expecting to sail from San Francisco for Manila on March 26, to engage in botanical work under the direction of the United States Philippine Commission.

Professor L. R. Jones, of the University of Vermont, is enjoying a half-year's leave of absence from his collegiate and experiment station duties. He is now at the University of Michigan, but will go a little later to Europe.

Dr. D. T. MacDougal returned to New York on March 6 from a botanical expedition to Lower California and Arizona. He has brought back a large quantity of living and dried plants from the little-explored regions about the Gulf of California.

Two able and suggestive papers on eastern violets have recently been published, one by Mr. Witmer Stone under the title of "Racial Variation in Plants and Animals, with special Reference to the Violets of Philadelphia and Vicinity" printed in the *Proceedings of the Academy of Natural Sciences of Philadelphia* for October 1903 (issued December 4), and the other by President Ezra Brainerd under the title of "Notes on New England Violets" in *Rhodora* for January. Both are based on much continuous observation of colonies of living plants representing various species and forms. Dr. Brainerd emphasizes the diagnostic value of the mature capsules.

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TORREYA

April, 1904

THE EARLY WRITERS ON FERNS AND THEIR COLLECTIONS — II. J. E. SMITH, 1759–1828; SWARTZ, 1760–1818; WILLDENOW, 1765–1812

BY L. M. UNDERWOOD

Aside from minor changes in the generic arrangement of Linnaeus * and occasional additions to the number of species by various writers, notably Thunberg, Forskål, Forster, Lamarck, and Cavanilles, the principal generic changes as well as the more extensive additions to fern species up to the end of the first decade of the last century were made by Smith, Swartz, and Willdenow. Sir James Edward Smith is not to be confused with the less eminent, but so far as fern lore is concerned, more distinguished John Smith who flourished a half century or more later. Smith published in 1793 an important paper † which was one of the first attempts at a natural classification of ferns. He established the genera *Woodwardia*, *Vittaria*, *Davallia*, *Cyathea*, *Hymenophyllum*, *Gleichenia*, and *Danaea*. While some of these, like *Cyathea*,‡ for example, were highly unnatural groups, the

* Theodor Holm (TORREYA, 3: 187–188) has taken exceptions to my statement regarding the types of Linnaeus. It is well known that Linnaeus' one-line descriptions of ferns are worthless, and in many cases he gives only citations. As I have shown, among the ferns at least, his types are equally so, and Mr. Holm says even worse things about them. There is therefore nothing left on which to depend for identifying his types but his citations and, on these, rational interpreters of Linnaeus have hitherto depended for identifications. If now, as Mr. Holm avers, these are not to be regarded as typical of his species but merely as giving "some idea of their general habit or aspect," Linnaeus becomes from a systematic standpoint even more useless than we have given him credit for being.

We examined the specimen preserved under *Osmunda Lunaria* in herb. Linnaeus last summer and it was labeled as before stated.

† Tentamen Botanicum de Filicum generibus dorsiferarum. Mem. Acad. Sci. Turin, 5: 401–422. *pl. 9.* 1793 (also sep. pp. 22). Smith also published various articles on ferns in Rees' Cyclopaedia, which was published between 1802 and 1819.

‡ *Cyathea* besides containing three genera of tree ferns as now understood included also two of our delicate bladder ferns (*Filix*)!

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generic arrangement was far in advance of anything that preceded it.

Smith was president of the Linnean Society (London) for many years and after his death his collection was purchased by the society, at whose rooms it is now easily accessible for examination. The plants are well preserved, but, as in many of the early collections, many ferns are represented by tips of leaves only and some of these have served as types of new species.

Olof Swartz issued the first formal enumeration of all known ferns in his *Synopsis Filicum* (1806) and presented the next general conspectus of fern genera. In this and previous works he described a large number of species and established the genera *Marattia*, *Grammitis*, *Aspidium*, *Diplazium*, *Lygodium*, *Botrychium*, *Cheilanthes*, *Anemia*, *Mohria*, and *Psilotum*. His *Synopsis* recognized thirty-eight genera and his work is usually regarded as the first real datum-line for the systematic study of ferns. To show how clearly he outlined the system so long familiar to fern students in the later *Synopsis Filicum* of Hooker and Baker (1868, 1874) we give an outline of his classification:

I. GYRATAE

Soris nudis

ACROSTICHUM (46*), MENISCIUM (3), HEMIONITIS (8), GRAMMITIS (13), TAENITIS (1), POLYPODIUM (102).

Soris indusiatis

ASPIDIUM (93), ASPLENIUM (75), CAENOPTERIS (9), SCOLOPENDRIUM (2), DIPLAZIUM (9), LONCHITIS (4), PTERIS (79), VITTARIA (6), ONOCLEA (12), BLECHNUM (14), WOODWARDIA (8), LINDSAEA (14), ADIANTUM (32), CHEILANTHES (16), DAVALLIA (29), DICKSONIA (16), CYATHEA (10), TRICHOMANES (21), HYMENOPHYLLUM (28).

II. SPURIE GYRATAE

Capsulis rimatis

SCHIZAEA (6), LYGODIUM (11), ANEMIA (17), MOHRIA (1), OSMUNDA (6), TODEA (1), MERTENSIA (7), GLEICHENIA (3), ANGIOPTERIS (1).

* The numbers in parentheses indicate the number of species of each genus described in the *Synopsis*.

III. AGYRATAE

Capsulis multilocularibus

MARATTIA (4), DANAEA (2).

Capsulis bivalvibus

OPHIOGLOSSUM (9), BOTRYCHIUM (7).

Besides the above genera Swartz also treated under the Lycopodineae the genera LYCOPODIUM (65), TMESIPTERIS (1), and PSILOTUM (2).

Swartz' work is of special importance to us at this time since many of his species were based on collections he made in the West Indies when he visited Jamaica and Haiti in the years 1784–1786. His collection, which we have not yet seen, is preserved at the Academy of Sciences at Stockholm and is said to be in a most excellent state of preservation. Various writers on West Indian ferns, notably Jenman, have referred to various types of Swartz as being found in the British Museum. It is true that some of the earlier botanists occasionally distributed their type material during their lifetime, and it is also true that some specimens of ferns came to the British Museum from Swartz, but there seems to be no warrant or at least no certainty that any of his types ever came there : in fact all the probabilities are against it, and his types must be sought in his native country. Swartz also published shorter papers on ferns, the last being published in 1817, only a year before his death.

The next enumeration of ferns was made by Willdenow in 1810 * in the fifth volume of his edition of *Species Plantarum*, although his work on ferns had commenced in 1802 with his publication of the genera *Todea* and *Hydroglossum* (*Lygodium*) followed in 1804 by *Mertensia*, and in 1809 by *Struthiopteris* and *Lomaria*. His enumeration included 43 genera of ferns and 1008 species, enriched by the collections of Humboldt and Bonpland in meridional America, as well as by those of Bory and others mostly described here as new. Willdenow's collection is

*An enumeration of the known ferns was commenced by Lamarck in the *Encyclopédie Méthodique* in 1783 and was completed by Poiret in 1808. This however contained only 444 species in contrast with the 716 described by Swartz in 1806, and 1008 described by Willdenow in 1810.

maintained by itself in the Kgl. Bot. Museum at Berlin. Each specimen is numbered serially and all is thoroughly indexed so that the collection is more readily accessible that any other of the historic collections. The sheets enclosed in covers tied with tape after the usual continental method, are arranged in volumes of convenient size and stand side by side in a special case in the room used until recently by the late Professor Schumann for a study. The sheets are a trifle larger than foolscap paper and the plants are mostly in an excellent state of preservation. There is sometimes a little doubt about his "types" being the originals on which he based his species, as he is said at times to have given away his originals in those species of which he afterwards secured better material. Our own Muhlenberg was a correspondent of Willdenow so that his collection includes many species from the United States.

WILLIAM MARRIOTT CANBY

By H. H. Rusby

Mr. William Marriott Canby, one of the foremost citizens of Wilmington, as indeed of the State of Delaware, died on March 10 at Augusta, Georgia, to which place he had gone to recover from the effects of a series of colds from which he had been suffering during the winter. In his death, the botanical fraternity of America loses one of its most genial associates, as well as one of its keenest and most judicious discriminators of plant forms.

Mr. Canby was born in Philadelphia, on March 17, 1831. His early education was obtained in the schools, mostly private, of Wilmington, whither his parents moved during his early childhood. He afterward attended a Quaker institution at Chadd's Ford, on the Brandywine. After his graduation, the state of his health apparently demanding an out-of-door life, he engaged in agriculture, near Coatesville, Pa. This country life was chiefly responsible for the development of Mr. Canby's very great love of plant-life, although inheritance, and an early association with students of botany, had already given him a predilection for that study. He studied and collected the local flora of Coatesville and vicinity, and in 1858 indulged in the great pleasure of a

botanical excursion to Florida. Mr. Canby always spoke of this trip as one of the most delightful of his botanical experiences. The excursion is of public interest because it was very influential in extending Mr. Canby's interest in the North American flora, of which he afterward accumulated such an excellent representation.

Two years later, he made extensive collections in the northeastern United States and in Canada, afterward using this material for exchange purposes, in building up his herbarium. In the succeeding years he made a number of similar more or less extended collecting tours in different portions of the country, and accumulated a large amount of exchange material. Among his exchange correspondents were Doctors Gray and Engelmann, through whom his exotic herbarium was largely acquired, although he arranged a number of similar exchanges during a brief trip to Europe in 1859(?).

In 1866, Mr. Canby abandoned farming, and took up his residence in Wilmington, where he quickly laid the foundation for a broad and highly successful business career; fairly successful in his own interest, more so in the sterling honesty and punctilious honor with which he guarded the interests which others confided to his keeping. He was for a time President of the Delaware and Western Railroad and, upon its absorption by the Baltimore and Ohio, he became a Director of the latter company, a position which he held up to the time of his death. In 1880, he became President of the Wilmington Savings Fund Society, which position, also, he held at the time of his death. He was connected with various other financial enterprises and was especially active in conducting or advising in the finances of various benevolent organizations, especially the Home for Friendless and Destitute Children. He was a member of the Presbyterian Church and was active in church and Sabbath-school work. Probably no other of the numerous public enterprises with which he was connected interested him more, or yielded greater or more permanent results, than the admirable public park system of his city, of which he was one of the designers. He continued active in the administration of these parks as long as he was able to work, and the preservation of their features of natural beauty, the liberality of their treatment, and the development of their scientific

value, were largely due to his influence. Mr. Canby was an earnest member of the Republican party, though never narrow or partisan in these relations.

It is not a very rare occurrence for active business men also to pursue some scientific avocation with activity and success; but it must always be regarded as remarkable that one with such numerous and varied interests in financial, religious, charitable and social life, and in city government, and who devoted to them all sufficient time and energy to have left a strong impress upon them, should have also found time to perform the vast amount of herbarium work for which Mr. Canby was noted.

As a botanist, Mr. Canby was a contemporary, and an honored correspondent and beloved associate, of Torrey, Gray, Watson, Engelmann, Thurber, Sullivant, Porter, Traill Green, Vasey, Hall, Bebb and many others of their day, and he was a typical representative of their school. For most of these men, Botany, so far as their active interest in it extended, meant the accumulation of a herbarium and the study of generic and specific relationships. The amazing activity of the last quarter of a century in the investigation of plant anatomy, morphology, physiology and chemistry, could scarcely have been conceived of by them, and those who, like Mr. Canby, lived to witness it, were not qualified, either by taste or training, to participate in it. To these men, moreover, Gray's Manual represented about the exact facts of their science, so far as the local flora was concerned. That the systematic botany of that day was radically wrong in its conception of specific limits; that every township abounded in valid species which had been loosely aggregated with others; that Gray's Manual required expanding by about twenty per cent., and Chapman's by fifty: are ideas which would have been scouted by most of them, were, indeed, almost bitterly resented by some, upon the merest suggestion. Yet the general correctness of this modern view is now recognized by nearly all, and Mr. Canby had been able, before his death, largely to accept it. It is upon the basis of the then prevailing views that his herbarium-work must be judged; and it can be said that he was accustomed to notice and to note the forms, though he did not fly in the face of prevailing custom in their interpretation.

Besides the above-mentioned exchange resources employed by Mr. Canby in enlarging his herbarium, he was a liberal purchaser of collectors' sets, especially of American plants. In 1892 his herbarium comprised 30,000 species and not less than five times that number of specimens. An outline of its composition has been published by the writer (Bull. Torrey Club, 19: 336). Its cases had increased in number until they entirely outgrew the accommodations of Mr. Canby's home. Room after room, and finally the halls, had been invaded; alterations had even been made for it, and again its quarters had become crowded, until at length Mr. Canby decided to dispose of it, and it was purchased by the College of Pharmacy of the City of New York in the year named. Here it has been carefully preserved but, unfortunately, the conditions have not been favorable for its continued growth. With his own herbarium off his hands, Mr. Canby at once applied himself to developing that of the Society of Natural History of Delaware, which before the time of his death, had come to number more than 13,000 species.

All Mr. Canby's herbarium work was performed with the most scrupulous care, as to both mechanical and scientific details. All specimens were mounted with his own hands, on the best of paper and with such a display as to admit most perfectly of their study in this position. At frequent intervals thereafter they were brushed over, to remove dirt and exclude vermin. All inscriptions were made in a clear and beautiful hand, and are remarkably full, both as to records and opinions. The genus-covers are equally well inscribed, bearing the number of the family, according to the Benthamian arrangement, the number, name and author of the genus, and the page reference to Bentham and Hooker's *Genera Plantarum*.

Like most of the botanists of his day, Mr. Canby studied botany because he loved plants. To him plants were living individuals, and herbarium specimens derived their interest from the fact that they were the best obtainable representatives thereof. While the botanical studies of that time lacked the scientific value, and ultimately, the economic value of those of the present, they embodied a grace and conferred a delight as unknown to a host of unfortunate laboratory slaves of the present generation as is the scent

of fresh clover to a city car horse. That good-fellowship which was promoted by the botanical "clubs" of Mr. Canby's generation is now of historical interest, and the new regime has not yet supplied anything that can be compared with it. The death of Mr. Canby reminds us of how few of his former associates still remain with us.

NOTES ON EVENING PRIMROSES

By Kenneth K. Mackenzie

One of the most noticeable and common plants along the line of the Chesapeake & Ohio Railroad on both sides of the boundary line between Virginia and West Virginia is an evening primrose with unusually large yellow flowers. Growing on open sunny clay banks and along the rivers in loose, rocky soil, it forms one of the characteristic plants of the country, and almost entirely replaces the common *Oenothera biennis* L. It may be described as follows:

Oenothera argillicola sp. nov. Biennial, with numerous stems ascending from the same root, 5–15 dm. high. Stems puberulent, but otherwise without pubescence: leaves of the stemless plant of the first year rosulate, 6–15 cm. long, the blades oblanceolate, 15 mm. or less wide, sinuate, acute, puberulent on both sides, the mid-nerve strongly developed, tapering at the base to a long, rather narrowly winged petiole; cauline leaves of the flowering plants of the second year with narrowly linear-lanceolate blades, the well-developed ones 6–8 cm. long, 7 mm. or less wide, remotely sinuate-dentate, acute, glabrous or slightly puberulent, tapering to a petiole-like base and often strongly decurrent on the stem, forming well-developed ridges: calyx-tube 3–4 cm. long and longer than the sepals, perfectly glabrous, as also are the sepals, the tips of the latter free, spreading, often 3–4 mm. long: petals bright yellow, obcordate, crenulate, 3–4 cm. long, so that the open flower is often 6–8 cm. across: capsules perfectly glabrous, 2–3 cm. long, sessile, gradually tapering upward from the broad base and often strongly curved, somewhat quadrangular, strongly ribbed: seeds angled, 1–1.5 mm. long.

This plant with its ascending, non-hirsute stems, narrow leaves, large flowers, glabrous calyx and glabrous, long-tapering capsule is one of the most distinct species of this section of the genus, and is well worthy of cultivation.

Type collected by myself near White Sulphur Springs, West

Virginia, August 27, 1903, No. 373. There are no specimens referable to this species in the collections at the New York Botanical Gardens. Botanists believing in the validity of the genus *Onagra* would call this plant *Onagra argillicola.*

In view of the abundant literature which has appeared within the last few years on variations produced in *Oenothera biennis* under cultivation, the inquiry naturally suggests itself whether the species above described may not be such a variation only. Of course, it is now impossible to determine how or when it arose, but as it exists now it is as true a species as could be desired. Locally it is a plant of great abundance, and technically it has numerous distinguishing features, as shown above.

Field botanists naturally get well acquainted with variations in *Oenothera biennis*, and know within general lines what may be looked for, but in addition to the above plant (of whose specific rank, I feel sure) I have collected another form of *Oenothera*, which for the present must be referred to *O. biennis*, although often very distinct. This plant, which grows in sunny situations in low grounds along the Missouri River around Kansas City, Missouri, in many respects bears a strong resemblance to *Oenothera cruciata* Nutt. of the east, and I have often been tempted to refer it to that species. It differs, however, in having (1) an abruptly narrowed capsule, (2) short buds, (3) shorter, less acuminate sepals, (4) inconspicuous sepal tips, (5) less pubescent capsules, and (6) broader, more obcordate petals. I cannot resist the belief that this form may be a mutant produced naturally in much the same manner as Prof. de Vries secured mutants in cultivated plants. This belief is based upon its distinct and largely constant characters, while at the same time it seems always to occur in the vicinity of more typical plants. If this belief is well founded, it answers an inquiry propounded by authors as to the occurrence of these mutants in nature, and in this light points to an interesting field for observation.

Less noticeable variations in *O. biennis* are of common occurrence around Kansas City. Indeed, as a whole the species seems to be in a very variable state in that neighborhood, and certainly a long-continued series of observations on plants produced from seeds collected there would yield interesting results.

SHORTER NOTES

Mutations and Forms. — For nomenclatural purposes, I have found occasion to divide variations (not subspecies) into two groups, designated mutations and forms. There is nothing new in this idea, but as it has not always been understood, some explanation may be desirable.

Mutations are variations in kind, probably always congenital, and frequently (at least) atavistic.

Examples are:

Viorna Douglasii (Hook.)* mut. *rosea* (*Clematis Douglasii rosea* Ckll. West Amer. Scientist, **5**: 5. 1888), in which the flowers are pink instead of blue.

Sambucus microbotrys Rydb. mut. *xanthocarpa* and mut. *oinocarpa* (*S. racemosa xanthocarpa* and *oinocarpa* Ckll. Bull. Torrey Club, **18**: 170. 1891), in which the fruit is of colors different from that ordinarily found.

Lilium montanum Nels. mut. *pulchrum* (*L. Philadelphicum pulchrum*, Aldrich, Science Gossip, Au 1889), in which the usual spots on the flowers are absent.

Forms are variations in degree, frequently induced by external conditions, and not usually atavistic. Examples are found in the polymorphic species of *Batrachium*, the *Polygonum*-group, etc.

Mutations, as here understood, are not adaptive, unless accidentally. Forms usually are adaptive. Just how far the characters of any given form are congenital cannot easily be ascertained; in one sense they always are, that is to say, the plant has the inherited power of responding in a given way to certain stimuli, if it does not inherit what may be termed obligatory characters.

Subspecies differ from the above in that they occupy different environments (geographically or ecologically) and only connect with the species in certain places, and then by intermediates. The existence of numerous subspecies as here defined (*e. g.*, in mammals) seems to constitute a strong argument against the mutation theory of species. On the other hand, polymorphism shows how characters which in themselves are good enough to base species (or even genera) upon may arise within specific limits,

* **Viorna Douglasii** = *Clematis Douglasii* Hook. Fl. Bor.-Am. 1: 1. *pl. 1.* 1830.

and if one phase should finally separate from the other (*e. g.*, by the disappearance of one phase in one locality, and of the other in another, or by some Mendelian process), species would arise without any subspecies, as defined above, being developed. Changes in the colors of flowers might become specific in this way (*cf.* the white-flowered *Cleome*, forming a race in Arizona), and albinism in snails, which certainly begins as a mutation, has in some instances become a valid specific character.

Race might be used to designate local varieties originating as last indicated, and not connected by intermediates.

Variety is a general term to use only when the classification of the plant or animal under one of the above categories cannot be determined.

T. D. A. Cockerell.

A new Hydnum.— **Hydnum Earleanum.** Resupinate: subiculum closely adnate, scarcely separable, broadly effused, thin, 1–2 mm. thick, golden yellow: spines 3–6 mm. long, crowded, awl-shaped, slender, golden yellow: spores subglobose, colorless, smooth, about $4 \times 3\mu$. Growing on under side of decorticated log (*Ostrya Virginiana?*).

The beautiful golden yellow color will easily distinguish this plant. A small tree about six inches in diameter had been cut down but not entirely severed from the stump. The bark had been stripped off and on this smooth surface the *Hydnum* was growing. It covered a space two feet long and three inches wide It could easily be seen at a distance of 75 feet. I have never seen any other fungus with such a beautiful yellow color. This color however disappears in drying, fading to a pale flesh-brown.

Type locality: Mud Lick Hollow, Armstrong County, Pa.

Type specimen in writer's collection, Carnegie Museum, Pittsburg, Pa.

This plant has been named in honor of Professor F. S. Earle of the New York Botanical Garden. D. R. Sumstine.

Kittanning, Pa.

REVIEWS

How and Why the Sugar Maple Bleeds

For several years the botanists and chemists of the Vermont Experiment Station, assisted by sundry students of the University of Vermont, have been studying certain phenomena associated with maple sap flow. The details of this work are available in a bulletin recently issued.* Some of the more interesting facts and conclusions follow, but only a small portion of these can here be mentioned.

Maple sap is practically a solution of sugar in water with traces of mineral and flavoring matters. The sugar content averages nearly 3 per cent., but this varies with tree and season. Seasonal variations are related to foliage development and climatic conditions. Foliage variations may be considerable. Thus the same tree which carried 8,846 square feet of leaf surface in 1899 developed 14,930 feet in 1900. The variations in sap composition between individual trees is even more noteworthy, extremes varying from 1.33 per cent. to 8.20 per cent. being recorded. The trees having larger tops and fuller exposure to light yield richer sap as a rule. There are however large differences where conditions and vigor of the trees appear identical and one must believe that there is individuality in the productiveness of maple trees much as there is in that of milch cows. The average yield per tree in a good season is about three pounds of sugar, which probably represents less than 4 per cent., of the entire sugar content of the tree.

The time and rate of sap-flow are directly related to seasonal conditions and temperature variations. Whenever during late winter and early spring sudden fluctuations occur in temperature in the vicinity of 0° C., sap flow begins. Flow develops with rise of temperature above this and ceases with its fall. These interrelations between sap movements and temperature variations were closely followed by attaching pressure gages, such as are commonly used on steam boilers, to gas pipes screwed into maple trunks. The flow of sap into such pipes develops pres-

* Jones, C. H., Edson, A. W. and Morse, W. J. The Maple Sap Flow. Vt. Exp. Sta. Bull. No. 103. December, 1903. Obtainable from the Experiment Station, Burlington, Vt.

sure which corresponds to the rate of flow in tapped trees. By employing self-recording gages and thermometers complete seasonal records have been obtained which reveal a striking parallelism in the fluctuations of pressure and of temperature. This has led some to explain the phenomenon of sap pressure and flow as due simply to the expansion with rise of temperature of the gas imprisoned within the woody tissues; but the fluctuations observed in pressure and suction are far greater and more sudden than this physical explanation can account for. Thus variations are frequent in these gage records of ten or fifteen pounds pressure with a change of but a few degrees in temperature. Extreme fluctuations are recorded of nearly thirty pounds to the square inch, within twenty-four hours, viz., from 5 pounds suction to 22 pounds pressure. A rise of over twenty pounds in pressure was observed with a rise in air temperature of only two degrees, which would mean even less increase in tree temperature. The conclusion is that sap-flow in the sugar maple is a true bleeding phenomenon, attributable to the vital activities of living cells. The pressure shown by the gage is simply a partial expression of the energy of the countless living, working protoplasts of the maple stem.

There is little evidence of "root-pressure"; in fact on good "sap days" the flow into the tap hole comes chiefly from above downwards. We must regard the stem tissues as chiefly active, the cells in the vicinity of the tap hole operating alternately as suction and force pumps, so to speak, sucking the sap from root and remoter stem tissues and forcing it out through the tap hole.

It is not difficult to conceive how a rise of temperature past a critical point for their vital activities should arouse or stimulate the bleeding activities of the cells and how a fall below this point should check them. The suction thereupon developed would seem to be due to osmotic reabsorption of the exuded sap by the same cells.

L. R. Jones.

PROCEEDINGS OF THE CLUB

Wednesday, February 24, 1904

This meeting was held at the New York Botanical Garden; Professor Underwood in the chair; sixteen persons present.

The minutes of the previous meeting were read and approved.

Dr. Britton referred to the opportunity of members to become applicants for a grant of fifty dollars from the John Strong Newberry Fund, which this year is available for botanical or zoological research.

The announced paper of the scientific progam was by Mr. Percy Wilson under the title of "Remarks on some Economic Plants of the East Indies."

In the spring of 1901, Mr. Wilson was commissioned by the New York Botanical Garden to accompany the Solar Eclipse Expedition to the East Indies, organized by Professor Todd of Amherst College, the chief purpose of Mr. Wilson's visit being to obtain collections of native plants and plant-products for exhibition in the museum of the Garden. Most of his collections were made on the island of Singkep, which is a two days voyage southward from Singapore. This island is about 25 miles in length and 16 in greatest width. Two-thirds of it is covered with a dense tropical jungle, the remainder having small scattered native villages. Various fiber-products, starches and sugars, manufactured and used by the inhabitants of these villages, were shown. In discussing fiber-products, examples were first exhibited in which a whole leaf or a considerable part of it is made use of. Of these leaf-fibers, one of the most extensively utilized is from the leaves of the screw-pines, whose generic name, *Pandanus*, is a Latinized form of the Malay word "pandan," a named applied to many species of the genus. In many of the East Indian islands, large tracts are covered by these *Pandanus* trees or shrubs, growing in such profusion as to form impenetrable masses of vegetation; while species growing singly or a few together abound principally in the vicinity of the sea. The latter bear many thick aerial roots, which at a distance have the appearance of supporting the plant in the air. The leaves and roots are the parts of the chief economic importance. The leaves are gathered in large numbers, tied into bundles, are carried by the men to the villages, where the women remove with a large knife all spines from the margins of the leaf and the under surface of the midrib. Each leaf is then exposed to fire, after which it is cut with a sharp four-bladed knife into strips

of uniform width. After several days of soaking in water and bleaching in the sun, each strip is separately drawn between the thumb and a thin bamboo stick. By this treatment they become flexible and can be wrought into any desirable shape without injury to the fiber. Two plants in particular, "pandan tikar" (*Pandanus Samak*) the mat screw-pine and "pandan laut" (*Pandanus fascicularis*), the sea-shore screw-pine are considered as yielding the best grade of leaves for mat- and basket-weaving. Other species bearing larger and coarser leaves are regarded as inferior. Of these, the "mengkuang" (*P. atrocarpus*), an arboreal form, is commonly found in swampy places. The leaves of this are made into hats, and into large mats which often serve for the entire sides of houses or for the covering of carts. Styles and designs in weaving differ in the different islands. In some places highly colored mats with red, green, brown, and purple strips interwoven are to be found. The dyes used are said to be chiefly of vegetable origin. A red dye is extracted from the leaves of the teak, a green from the shoots of the banana, while brown or chocolate color is obtained by burying the strips in mud and water for several weeks. In some regions where species of *Pandanus* abound these thick aerial roots are used for corks; sections of these roots several inches in length are beaten out at one end and thus made to serve as brushes. Leaf-fibers from the leaflets of the "nipah" (*Nipa fruticans*), a low stemless palm, are woven into large shingles known as "attaps."

Fibers derived from the vascular bundles alone are obtained from the leaf-stalks of a common fern, *Dicranopteris linearis*. After the long bundles are split out from the stalks, they are drawn separately through a series of holes of gradually diminishing sizes punctured in a piece of tin. With the strong fiber thus obtained fine hats are made which are worn by the Malay men at their various festivals. The stems of the bamboo, or strips and fibers obtained from them, are put to a great variety of uses by the natives.

Various food-products of vegetable origin were then discussed. An important starch is sago, under which name are understood starches derived from several kinds of palms and cycads. Most

of it, probably, comes from the trunk of *Metroxylon Sagu*, the true sago palm, which inhabits many of the islands of the Malay Archipelago. This palm grows to a height of forty feet or more and has a large comparatively smooth trunk, from the interior of which the starch is derived. In the preparation of the sago a full-grown tree is selected just before the expansion of the inflorescence, the trunk is felled and cut into sections three or four feet in length, which are thrown into water and soaked for several days. Afterward, the outer fibrous portion is removed and the interior is reduced to a coarse sawdust by means of a crude grating apparatus. This sawdust-like powder is then put into a large vessel where the starch is crushed out with the aid of water and the feet of a native. It is then drawn off suspended in the water and is finally dried and shipped away for refinement.

Palm sugar is derived chiefly from the sugar palm (*Arenga saccharifera*) and the cocoanut palm (*Cocos nucifera*). The sugar is obtained from the *Arenga* by binding the numerous branches of the pendulous inflorescence into a compact cylinder, without removing them from the tree, and then chopping off the ends and making several incisions along the sides of the branches. The sweet sap is caught in a vessel made from a bamboo-stem ; it continues to flow for several days, is collected every twenty-four hours, and is boiled down over a crude oven.

The paper was brought to a close with remarks on masticatories such as the betel-nut — the fruit of the Areca palm (*Areca Catechu*) — and on some of the edible fruits, such as the durian and mangosteen.

Mr. G. V. Nash showed flowering species of Melastomaceae from the conservatories of the New York Botanical Garden, including one of *Heterocentron elegans* from Mexico and one of *Medinilla magnifica* from the Philippines.

Dr. N. L. Britton exhibited specimens of two apparently undescribed species of poplar from Wyoming, one allied to *Populus tremuloides* the other to *P. angustifolia.*

Marshall A. Howe,
Secretary pro tem.

Vol. 4 No. 5

TORREYA

May, 1904

A CANOE TRIP ON THE ST. FRANCIS RIVER, NORTHERN MAINE

By W. W. Eggleston

The first week in August, 1902, found a small gathering of New England botanists at Rivière du Loup, Quebec, although the meeting was all unplanned on their part.

When I left the St. Lawrence steamer the hotel porter said "two men have just taken the steamer with packs like yours; they are coming back in a couple of days." The register showed M. L. Fernald and E. F. Williams. The next steamer brought Judge J. R. Churchill, who was easily persuaded to stay over a day when he found that *Dryopteris fragrans* Schott could be seen at Rivière du Loup Falls.

The next night I was routed out about eleven o'clock, but one could easily forgive Merritt Fernald when he proposed a trip on the St. Francis. This stream was first explored by C. G. Pringle in the 70's. In Pringle's time the only railroad in the country was the Intercolonial on the St. Lawrence; now the Temiscouata railroad runs from Rivière du Loup to Edmunston on the St. John River and then up the St. John to the mouth of the St. Francis.

This was the route Fernald and I took. At St. Francis we secured canoes and guides and were carried ten miles to the foot of Glazier Lake, the end of wagon roads.

The expedition started very favorably, for what New England botanist would not have good luck with William Oakes as principal guide. Such was the fact, and a good guide, canoeman and cook was W. Oakes.

Our trip from the foot of Glazier Lake up the St. Francis was to include about fifteen miles of lakes and twenty-five miles of "strong water," as the guides called it, to Boundary Lake,

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Quebec. We were now entering a great wilderness. The St. John river valley is cleared up to St. Francis and there is one village, Allegash Plantation, fifteen miles above St. Francis; outside of the St. John valley proper one may go from twenty-five to two hundred miles to the nearest house.

On the St. Francis, at the foot of Glazier Lake, there are two or three farms, at the head of the lake two more ; ten miles up the river, at the head of Beau Lac, are three more settlers; and thence twenty-five miles to Boundary Lake are no settlers. Most of the settlers, both on the St. Francis and the St. John, have come in since Pringle's time.

By our landing at Glazier Lake was plenty of *Salix lucida intonsa* Fernald. This salix would be easily mistaken for a very large *Salix candida* Willd. On the Maine side is the type station for *Carex intumescens Fernaldi* Bailey ; here also we saw *Carex atratiformis* Britton, four feet high.

We left Glazier Lake at noon, making Glazier Lake, Cross Lake and Cross Lake Rapids before supper, paddling up the six miles of Beau Lac and reaching the head of the lake after dark. We pitched our tent on the sands, rolled up in our blankets, and most of us went to sleep, but the greenhorn, wedged in between friend and guide, found a hole and hummock that would not let him sleep. The next day at noon we were at the foot of the Kelly Rapids, which are three miles long and full of boulders. The guide gave us an invitation to walk ; we accepted and botanized the Maine shore to the head of the rapids, finding great quantities of *Peramium ophioides* (Fernald) Rydb., *P. tessellatum* (Lodd.) Rydb., *Lysiella obtusata* (Pursh) Rydb., *Lysias orbiculata* (Pursh) Rydb., *Hypopitys Hypopitys* (L.) Small, *Petasites palmata* (Ait.) A. Gray and my first *Listera auriculata* Wiegand.

We camped early this night, pitching our tent on the Quebec shore in a thicket of evergreens.

The next morning all about our camp we found *Pyrola asarifolia* Michx. and *P. minor* L. and in a spring bog *Listera auriculata* Wiegand (in flower).

On a Maine blueberry barren we found *Pyrola rotundifolia* L., *Aster junceus* Ait., and great quantities of *Vaccinium Cana-*

dense, blackflies, and midgets; we soon decided that the latter had preëmpted the region and made a hasty change of base. By noon we were at the foot of Boundary Lake and the iron boundary post, the most northern point of Maine.

Here we found *Eatonia Pennsylvanica* (DC.) A. Gray, *Panicularia laxa* Scribn., *Graphephorum melicoideum* (Michx.) Beauv., *Chaetochloa viridis* (L.) Scribn., *Carex atratiformis* Britton, *Streptopus amplexifolius* (L.) DC., *Sanguisorba Canadensis* L., *Capnoides sempervirens* (L.) Borck., *Mentha Canadensis glabrata* Benth., *Viola septentrionalis* Greene, *Tetragonanthus deflexus* (J. E. Smith) Kuntze, *T. deflexus heteranthus* (Griseb.) Britton (one plant), *Viburnum pauciflorum* Pylaie, *Erigeron acris* L., *Solidago hispida* Muhl., *Euphrasia Canadensis* Townsend, and *Tanacetum Huronense* Nutt.

We hoped to find *Isoetes hieroglyphica* A. A. Eaton, *Selaginella selaginoides* (L.) Link, and a red-flowered *Castalia*. The wind was so high that afternoon and the next day that botanizing on the lake was out of the question.

Boundary Lake extends north and south about nine miles. In Pringle's day from the foot of the lake five miles up the west shore was an unbroken forest; now it is all cultivated land, and the "mossy shore under cedars" where Pringle found *Selaginella selaginoides* is now the location of a thriving saw mill, sawing the cedars. Incidentally, all of the logs driven in the St. Francis and the upper St. John and most of the timber used in houses is the white cedar, *Thuja occidentalis* L. The next morning, turning our backs on the wind-swept shores of Boundary Lake and red pond lilies, we started down the river. This was the most delightful part of the trip. Running along noiselessly and using the paddle but for steering, we saw several deer but no moose, although we had seen many of their tracks.

Down the river a few miles on the Maine shore were some quite large lagoons and a great marsh; here were *Carex arcta* Boott, *Nymphaea advena variegata*, *Nymphaea hybrida* Peck, *Nymphaea Kalmiana* (Michx.) Sims, *Rhamnus alnifolia* L'Her., *Hippurus vulgaris* L., *Myriophyllum alterniflorum* DC., etc. Thus far, trout-fishing had been very poor but this morning we had some fine sport.

At night we were at our old camp at the head of Beau Lac. In the alluvial woods *Aster hirsuticaulis* Lindl. was abundant. The lake in lower water would have been fine botanizing, but *Isoetes* that ought to have been near the surface was in three or four feet of water. I spent over an hour wading up to my neck in the cold water, supposing I was getting *Isoetes hieroglyphica* A. A. Eaton, but Eaton tells me that out of some three hundred specimens all but about a dozen are *Isoetes echinospora Braunii* Engelm.

The marshy shores gave us *Listera convallarioides* Nutt. and *Carex intumescens Fernaldi* Bailey, and near Cross Lake Rapids was *Asarum Canadense* L. Our guide thought he could show us the red water lily in Glazier Lake. It proved to be *Polygonum amphibium* L. growing with *Sparganium simplex angustifolium* (Michx.) Engelm. and *Myriophyllum verticillatum* L. The little rocky islet in the St. John at the mouth of the St. Francis had *Poa glauca* Vahl., *Juncus Dudleyi* Wiegand, *J. Vaseyi* Engelm., *Allium Sibiricum* L., *Astragalus alpinus* L., *Lathyrus palustris* L., *Aragallus Johannensis* Rydb., *Vaccinium caespitosum* Michx., *Gentiana acuta* Michx., *G. linearis* Froel., *Castilleja acuminata* (Pursh.) Spreng., *Aster longifolius* Lam., *A. longifolius villicaulis* A. Gray, *A. radula* Ait., *Solidago squarrosa* Muhl., *Tanacetum Huronense* Nutt., etc. This proved the best botanizing ground of the trip.

Rutland, Vermont.

SHORTER NOTES

Notes on the Local Flora. — Specimens of *Dryopteris simulata* and of *Woodwardia angustifolia* were found in abundance near Quogue, L. I., last summer. This is the fifth station in New York for the first and the sixth for the second. Very near these stations were found plants of *Caltha radicans*. This may be the West Hampton station of Britton's Flora for the division between the towns was not more than a third of a mile away.

In a swamp at West Hampton were found specimens of *Lycopodium alopecuroides*. This is the third station for Long Island.

A few plants of *Asplenium pinnatifidum* were found by a friend, Mr. Huntington, a few summers ago at Sharon, Conn.

This may be of interest in connection with the article, "A Summer in Salisbury, Connecticut" (Torreya, March, 1904), Sharon being not very far distant. This station was noted some time ago in *The Fern Bulletin*.

I am sure all these plants are correctly identified. *Dryopteris simulata* has been seen by Mr. Clute and *Asplenium pinnatifidum* by Mr. Bissell.

Frederick Wm. Kobbé.

142 East 18th Street,
New York City.

Viburnum molle Michx. — Mr. Rehder's recent remarks on this species (Rhodora, 6: 58. Mr 1904) finally clear up the interesting question of the application of the name, and solve it in the way Dr. Small and I have both suspected to be correct, but without a definite knowledge of Michaux's type specimen, we had been unable to improve upon the conclusions of Dr. Gray. Mr. Fernald's photograph of the type sheet in the Paris herbarium has supplied Mr. Rehder with the desired information. In addition to the synonym *V. Demetrionis* Deane and Robinson, cited by Mr. Rehder, should be added *V. pubescens petiolatum* Fitzpatrick (Man. Flow. Pl. Iowa, 140. 1899), and the range extended northward to Johnson and Jefferson counties, Iowa, where the shrub grows in rocky woods.

Michaux's subspecies *semitomentosum* is taken up by Mr. Rehder for the *V. molle* of Gray and more recent authors, the citation being *V. semitomentosum* (Michx.) Rehder, and the range given as from Kentucky to Florida and Texas. Mr. Harper's collections show that the plant occurs in Georgia. In Manual, p. 871, I indicated that it might extend northward to southern Pennsylvania; this suggestion was based on specimens with leaves but without flowers and fruit, collected by Dr. Small at Smithville, Lancaster County, in September, 1897; these, in their stellate pubescence and blunt teeth seem almost identical with those of specimens from the south.

N. L. Britton.

REVIEWS

Howell's Flora of Northwest America*

The seventh fascicle of Howell's Flora of Northwest America has now appeared. This finishes the first part, "Phanerogamae." The title is perhaps a little misleading, as the flora does not cover the western part of the British possessions, or Alaska. It would have been more appropriate if the title had been a "Flora of the Northwestern United States," as it is a manual of the botany of Washington, Oregon and western Idaho. Only those who have been actively engaged in writing manuals of systematic botany can imagine what such an undertaking means, what difficulties are met with and what an amount of work is needed. If the fact is taken into consideration that Mr. Howell had to work far away from our large collections and botanical libraries with scarcely any other facilities than those afforded by his private library and collections the excellence of the work is really surprising. The preliminary work on the flora was begun as early as 1882 and in 1896 the manuscript of the first fascicle was ready. A new difficulty now presented itself. He could not find in Portland a type-setter who could set the type for such a book, and Mr. Howell learned the trade and set the type himself. The first fascicle was issued in 1897 and the others at intervals of a year or two. The book contains 792 pages of compact descriptions and an index of 24 pages.

It is evident that Mr. Howell began the work with the intention of giving descriptions drawn by him from actual specimens, where it was posssible. When such were not found in his herbarium he tried to borrow from fellow botanists. In this he did not always succeed and had to reprint the original description. This method of course meant an enormous amount of correspondence and was delaying the work. It appears as if the method was partly discarded towards the end of the work, as it there seems to be more of a compilation. This may be said

* Howell, T. A Flora of Northwest America. Vol. 1. Phanerogamae. 8vo. Pp. 1–792 + Index. Portland, Oregon. 10 Au 1903. [Issued in seven fascicles, 1897–1903.]

especially of the difficult family Gramineae, where the last monograph is more or less closely followed. In many cases this was a very commendable way, but in others not, as, for example, in the treatment of *Poa*, where he follows Professor Beal. One improvement he has made on the latter's work, viz., in retaining *Poa Buckleyana* and *P. Fendleriana* and their allies in *Poa*. He places them under a subgenus *Atropis*, copying Beal's characters of the genus *Atropis* (which name however does not belong there but to *Puccinellia*), but not noticing that scarcely one half of the species referred there by Beal agree with the definition; nor did he know that *Atropis Lettermanni* Beal (*Poa Lettermanni* Vasey) and *Poa Brandegei* described in Beal's work are the same species and that the types of both were collected at the same station.

As no work has been published before on the flora of the region, Mr. Howell had to draw his information from a thousand and one scattered publications. We know that many times the same species has been described under different names by different authors (one *Aster* from Idaho, *A. Jessicae*, has received not less than four names). A good deal of sifting had therefore to be done and it is remarkable how well Mr. Howell has succeeded without having access to the types. It would be surprising, however, if he had not gone amiss sometimes. One such case we have noticed: *Sporobolus gracillimus* and *S. filiformis* were both based on *Vilfa depauperata* v. *filiformis* Thurber, and hence the same.

The numerous publications and segregations of recent date have of course caused considerable trouble. Some of our contemporary phytographers have a custom of describing species without indicating the relationships. The author of a monograph or manual, if he does not have the chance of seeing the types, must be a very good guesser if he happens to place the species in the right section of the genus. Mr. Howell guessed well as a rule, but missed occasionally, as, for example, when he placed *Gentiana anisocpala* Greene, next to *G. affinis*. It should have been placed with *G. tenella* and *G. acuta*.

Another kind of difficulty arises when one of the modern splitters breaks up a species, supposed to be transcontinental,

into several geographical species and does not give exact limits of their ranges. How can a botanist without access to all or most of the larger herbaria know if he is to include or exclude the original species, if he has not authentic material himself? The "Flora of Northwest America" therefore happens to contain several species not growing within a thousand miles of the region covered, *i. e.*, as far as can be judged from specimens in the collections of the New York Botanical Garden and Columbia University. Such species are, for instance *Scrophularia Marilandica* and *Polygonum erectum*, not found west of Nebraska; *Eriogonum corymbosum* and *Graphephorum Wolfii*, not north of Colorado; *Salix saximontana* and *Geranium Fremontii*, not north or west of Wyoming; *Tofieldia glutinosa*, *Poa glauca* and *P. laxa*, only found in the northeastern part of the continent.

With regard to nomenclature, Mr. Howell has been progressive, following the Rochester Code with slight modification and using in most cases the generic names adopted in the second edition of Heller's Catalogue. As to the limitation of genera he has been somewhat radical, adopting most of the segregations made in later years. As to the limitation of species he has on the contrary been rather conservative, ignoring many of the newer finer splits and proposing very few new ones himself. Those that he has proposed are well founded. He has admitted very few varieties. Those that he has admitted were probably not well known to him. In most cases he has raised the varieties to species if they could be well recognized; if not they have been ignored.

Whatever smaller defects the work may have, it will be of great value to the student of the botany of the Columbia Valley region. It will be for that region what Chapman's Flora has been for the South, Coulter's Manual for the Rockies and the Botany of California for the southern portion of the Pacific Slope. We need now a flora of the southwestern United States and the Great Basin.

P. A. Rydberg.

PROCEEDINGS OF THE CLUB

March 8, 1904

This meeting was held at the College of Pharmacy, with Vice-president Rusby in the chair; there were seventeen persons present. The minutes of the preceding meeting were read and approved.

The first paper on the scientific program was by Professor Francis E. Lloyd on "Recent Investigations on the Pollen-tube," and was an interesting exposition of the parallel results of Longo's investigations on the behavior of the pollen-tube in Cucurbitaceae and Professor Lloyd's work on Rubiaceae.

Longo finds that in *Cucurbita Pepo* L., the ovary is provided with a special conductive tissue reaching to the neck of the flask-shaped nucellus by means of which the pollen-tube follows a completely intercellular course from stigma to embryo-sac. In other species of *Cucurbita* and in *Citrullus vulgaris*, the neck of the nucellus is not long enough to reach to the conductive tissue, so that for a short distance the tube must move through a cavity. On reaching the neck of the nucellus, the pollen-tube forms a bulla that produces lateral outgrowths which Longo believes are for the purpose of reaching out after food materials, as their size seems to depend on the amount of starch present. This view is rendered somewhat questionable by the phenomena observed by Wylie in *Elodea*, where pollen-tubes may produce similar "cystoids" in the free space of the locule but never produce them in the tissues where food substances must be more abundant.

Longo supports his conclusion that the intercellular course of the pollen-tube is followed not because of inability to grow in open space, by showing that pollen-tubes may be produced in moist air from such normally endotropic forms as *Humulus Lupulus* L., *Picea excelsa*, etc. He interprets chalazogamy as a physiological fact having no bearing on phylogeny. In plants having endotropic pollen-tubes, he considers the direction of their growth to be determined chemotactically.

The main points in Professor Lloyd's independent conclusions from work on Rubiaceae are: (1) The form of cells in the conductive tissue does not determine the course of the pollen-tube, for in *Richardsonia* and *Diodia teres* the cells are elongated at right angles to the path of the tube. He believes the chemotactic stimulus which determines the direction to be differentially distributed from the egg cell. (2) The ectotropic or endotropic behavior of the pollen-tube is a physiological character.

The second paper of the evening, by Mr. Edward W. Berry was entitled "Some Monotypic Genera of the Eastern United States and their Ancestors." The phylogeny of *Liriodendron*, was briefly sketched, from its first appearance as a narrow simple-leaved form in the mid-cretaceous of the Atlantic coastal plain, its spread to Europe and Asia, its development into large lobate-leaved forms, and its final extinction except for the existing species of eastern North America and a waning variety in eastern Asia. Drawings of all the fossil species were shown, and numerous blue-prints of the leaves of the existing species, showing their parallelism and range of variation.

Sassafras was the second genus considered. It was pointed out that while the described fossil species were numerous, many of them are not allied to *Sassafras*. The species which were considered as positively identified were discussed, as well as the peculiar characters of the leaves of the existing species, both ancient and modern forms being abundantly illustrated.

The third genus discussed was *Comptonia*. Its former range and development were described and drawings of a number of the species were shown.

All three genera were considered to have taken their origin from simple-leaved ancestors which flourished during the closing days of the lower cretaceous, and to have originated in America, becoming dominant and widespread in pre-glacial times, finally becoming restricted to their present habitats chiefly through the agency of the glacial conditions of the Pleistocene period.

The paper was discussed by Professors Rusby, Underwood, and Lloyd and Dr. Howe. Adjournment followed.

Tracy E. Hazen,
Secretary pro tem.

March 30, 1904

The Torrey Botanical Club met in the morphological laboratory at the New York Botanical Garden with about 20 persons present. Dr. D. T. MacDougal called the meeting to order; Dr. C. C. Curtis was elected chairman and Mr. W. T. Horne secretary.

The first paper on the scientific program was "Notes on the Cytology of the Aquatic Fungi" by Dr. Cyrus A. King. Schroeter's classification of the Phycomycetes was reviewed and attention called to the fact that the conidia of the Peronosporineae resemble sporangia since they germinate by forming internal zoöspores. In the Saprolegniaceae, according to Trow, the eggs are at first multinucleate, all except the sexual nucleus in each egg being disposed of by digestion. Dr. King's researches have shown that in the Leptomitaceae, as far as known, the oögonia are at first multinucleate and the supernumerary nuclei are disposed of by migrating to the periphery of the cell where they are cut off in a distinct periplasm. In *Araiospora* the peripheral nuclei surround themselves with cell walls in such a way that the oöplasm is surrounded by a layer of periplasmic cells. In *Sapromyces* there is also a periplasm in which the nonsexual nuclei are cut off; it is however reduced to a very thin layer. The formation of a body in the center of the egg of *Araiospora* by the coalescence of several small cytoplasmic patches from various parts of the oöplasm was described. The body probably is an attraction center for the sexual nuclei. A similar structure was not found in *Sapromyces*. *Rhipidium* was also briefly described. The presence of a periplasm and the migration of the nuclei from the developing egg indicates that the Leptomitaceae are more closely allied to the Peronosporineae than to the Saprolegnineae. Photomicrographs were shown from Dr. King's preparations showing the facts brought out and showing also indirect nuclear division in the oögonium and zoösporangium of *Sapromyces*.

An interesting discussion followed.

The second paper was by Mr. B. C. Gruenberg and was entitled "Chemical Investigations on *Haematoxylon*." Haema-

toxylin is one of the most valuable of commercial dyes and the business of supplying the wood from which it is made forms an important industry in some of the West Indies. Considerable annoyance has been caused by the fact that some of the logwood or *Haematoxylon* trees contain little or no dye, whole shipments even having been condemned on this account. The so-called "bastard logwood" is not always to be distinguished at the time of cutting. It is either lighter in color or if dark at first it can be recognized by not becoming still darker on seasoning for some months as does the good wood.

Professor Earle investigated the disease in the field and concluded that the lack of pigment was not due to external conditions, or to disease, or to immaturity, but that the logwood is a variable plant and the bastard form is a variety or subspecies.

The percentage of carbon in the ash-free material was determined for different samples with somewhat varying results but showing that the good wood contains a slightly higher percentage, due probably to the carbon in the pigment.

Analysis of leaves, stems and roots of one-year-old plants showed that the bastard plants contained slightly more ash and water, but the difference was very slight.

Extracts of the pigment were made with a number of different solvents from varying samples of wood. The extracts with different solvents did not give parallel results as indicating the amount of pigment. In diluting the extracts chemical changes occurred. Alkalies increase the color of extracts of the good wood but not extracts of the bastard wood. Acids have a parallel effect.

Results on the soluble substances in the wood were not satisfactory on account of decomposition on drying. There are probably several pigments.

After a discussion of the paper the meeting adjourned.

WILLIAM T. HORNE,
Secretary pro tem.

NEWS ITEMS

Dr. H. C. Cowles, of the University of Chicago, devoted a large part of the month of April to field studies in plant ecology in the vicinity of Miami, Florida.

Miss Mary Perle Anderson, supervisor of nature study, University School, Chicago, has been appointed instructor in botany in Mt. Holyoke College for the coming year.

Dr. John K. Small and Mr. Percy Wilson, of the New York Botanical Garden, are spending a few weeks in making collections in the extreme southern end of the peninsula of Florida.

Mr. Homer D. House, recently assistant in botany in the Columbia University, has been acting instructor in botany in Rutgers College, New Brunswick, New Jersey, since April 1.

Mr. C. W. Hope, who had published extensively on the ferns of northern India, and many of whose specimens are in the herbarium of the New York Botanical Garden, died on February 16, at Kew, England.

Prof. Dr. Karl Schumann, of Berlin, died early in April. He was best known for his extensive studies upon the Cactaceae, and the fact that this family is almost wholly American makes his work of particular interest to American botanists.

Mr. Le Roy Abrams, author of the recently published "Flora of Los Angeles and Vicinity," has been appointed fellow in botany in Columbia University. Mr. Abrams received the degree of A. B. from Stanford University in 1899 and that of A. M. in 1902.

Dr. José Ramírez, chief of the section of natural history of the Instituto Médico Nacional, died in the City of Mexico, April 11, 1904. He was the author of "La Vegetación de Mexico" and of various other works on the flora and materia medica of Mexico.

Dr. Hans Hermann Behr, for many years professor of botany in the California College of Pharmacy, died in San Francisco on March 6, in his eighty-sixth year. Dr. Behr was the author of the "Flora of the Vicinity of San Francisco," published in 1888, and of several shorter papers on the Californian and Australian floras. He was also an entomologist, a linguist, and a man of very marked general ability.

In the prize essay competion of 1904, conducted by the New York Botanical Garden, from a portion of the income of the Caroline and Olivia Phelps Stokes Fund for the Preservation of Native Plants, the first prize, of twenty-five dollars, has been

awarded to Miss Mary Perle Anderson, of Chicago; the second, of fifteen dollars, to Miss Jean Broadhurst, of Trenton, N. J.; and the third, of ten dollars, to Mr. George Gordon Copp, of New York City.

Dr. and Mrs. N. L. Britton and Dr. Marshall A. Howe spent three or four weeks in March and April in making botanical collections in southeastern Florida, with Miami as a base, and on New Providence, Bahamas. Afterwards, Dr. Howe, in company with Dr. C. F. Millspaugh, of the Field Columbian Museum, Chicago, made the return trip from Nassau to Miami in a sail boat, taking ten days for the voyage and making collections on the Joulter Cays, Gun Cay, the Cat Cays and the Bemini Cays.

Fascicle I of Dr. Janet Perkins' "Framenta Florae Philippinae" has recently been published by the Gebrüder Borntraeger. This first fascicle is devoted chiefly to an "Enumeration of some of the recently collected plants of Ahern, Jagor, Lohor, Merrill, Warburg, and others." The author, whose work is being carried on at the Botanical Museum of Berlin, has the collaboration of Doctors Brand, Lindau, von Seemen, Graebner, Schlechter, Beccari, Warburg and Radlkofer in the treatment of certain families.

Professor Hugo de Vries, of Amsterdam, has engaged to deliver a course of lectures on "Mutation" at the summer session of the University of California in June and July. He is also to give a series of five lectures at the University of Chicago, August 22–26. Professor de Vries expects to reach New York on June 6. He will spend a few days at the New York Botanical Garden, and on June 11 will deliver the address at the dedicatory ceremonies of the Station for Experimental Evolution of the Carnegie Institution at Cold Spring Harbor, N. Y.

The course of popular lectures offered by the New York Botanical Garden for the spring of 1904 is as follows: April 30, "Japan, the Land of Lacquer and Bamboo," by Dr. C. F. Millspaugh; May 7, "The Form, Habits and Relationships of the Cactuses," by Dr. N. L. Britton; May 14, "The Vegetation of the Delta of the Colorado River, and of Baja California," by Dr. D. T. MacDougal; May 21, "Explorations on the Yukon

River, Alaska," by Dr. Arthur Hollick; May 28, "Arctic and Alpine Plants," by Professor F. E. Lloyd; June 4, "Carnivorous Plants," by Professor H. M. Richards.

Dr. James Hyatt, the last of the original members of the Torrey Botanical Club, died at Bangall, Dutchess Co., N. Y., on February 27, in the eighty-seventh year of his age. Dr. Hyatt's special work as a lecturer and writer was in the field of chemistry, but like many others of his generation he enjoyed a wide interest in the natural sciences as a whole. Members of the Club will remember the "Reminiscences of John Torrey," contributed by him to the exercises of Torrey Day, celebrated in New York June 27, 1900, in connection with the proceedings of the Botanical Section of the American Association for the Advancement of Science.

The Fifteenth Annual Report of the Missouri Botanical Garden contains in addition to reports for the year 1903 and library contributions the following scientific papers: "An ecological Comparison of some typical Swamp Areas," by Samuel Monds Coulter (24 plates); "Two Fungi growing in Holes made by wood-boring Insects," by Perley Spaulding (3 plates); "An ecologically aberrent Begonia," by William Trelease (2 plates); "Aberrant Veil Remnants in some edible Agarics," by William Trelease (10 plates). The number of species and varieties in actual cultivation at the Garden as shown by an inventory taken at the end of 1903 is given as 11,357; the number of books and pamphlets in the library, 42,262; the number of mounted specimens in the herbarium, 465,205; the number of visitors to the Garden in 1903, 79,039.

Professor F. S. Earle, who has been assistant curator of the New York Botanical Garden since the autumn of 1901, has resigned his position to accept the directorship of the newly organized Estación Agronómica Central de Cuba. Professor Earle spent the month of March and the early part of April in Cuba, engaged in the preliminary work of locating and organizing the Estación, which is to be at Santiago de las Vegas, about twelve miles from Havana. The staff is to include Mr. C. F. Baker, for the past year assistant professor of biology in Pomona

College, Claremont, California, as botanist; Mr. Percy Wilson, of the New York Botanical Garden, as assistant botanist, and Mr. William T. Horne, now fellow in botany in Columbia University, as assistant pathologist. Professor Earle sailed from New York for Cuba with his family on April 30.

"Alaska, Volume V. Cryptogamic Botany" is the title of a handsome octavo volume of 424 pages and 44 plates lately published by Doubleday, Page & Company, of New York. The subject matter is concerned with the results of the Harriman Alaska Expedition and comprises the following papers: "Introduction," by William Trelease; "The Fungi of Alaska," by P. A. Saccardo, C. H. Peck and William Trelease; "The Lichens of Alaska," by Clara E. Cummings; "The Algae of the Expedition," by De Alton Saunders; "The Mosses of Alaska," by J. Cardot and I. Thériot; "Alaskan Species of Sphagnum," by William Trelease (determinations, by Warnstorf); "Hepaticae of Alaska," by Alexander W. Evans; "The Ferns and Fern Allies of Alaska," by William Trelease. The papers on the Algae, Hepaticae and mosses were originally published in the Proceedings of the Washington Academy of Sciences and are here reprinted from the same electrotype plates, bracketed figures indicating the original pagination.

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TORREYA

June, 1904

RESISTANCE OF DROUGHT BY LIVERWORTS

By Douglas Houghton Campbell

We are accustomed to consider the archegoniates in general as moisture-loving plants, and this is, to a certain extent, true. But it readily may be shown that there are many exceptions to the rule, even in regions of abundant moisture; while in more arid districts it is becoming clear that many species have developed special contrivances for surviving long periods of drought.

In moister regions, like the eastern United States, many species of rock-haunting or epiphytic mosses occur which can survive a certain amount of desiccation; and among the Hepaticae may be mentioned various foliose Jungermanniaceae which share this peculiarity with the mosses. How far this power of resisting drought is found among the eastern thallose Jungermanniaceae and Marchantiaceae, so far as the writer is aware, has not been investigated.

For a number of years the writer has been interested in the archegoniates of California, especially the hepatics, and his attention has been directed repeatedly to the power shown by nearly all the species of resisting the long dry season which regularly prevails each year. In the region around San Francisco Bay, the dry season generally lasts from about the middle of May until late September or early October. Sometimes for fully six months no rain at all falls. This was the case in 1903, when from mid-April until October there was no rain at all, and not until November was the rainfall enough to start vegetation. Nevertheless, the growth of Hepaticae during the present season has been very luxuriant, and there is no evidence of any harm having resulted from the unusually protracted drought. In the bay region, however, there is seldom the excessive summer heat

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of the great central valley of California, and the heavy ocean fogs which prevail during the whole summer undoubtedly mitigate to a very considerable degree the complete lack of rain. Nevertheless, during the dry season the liverworts remain absolutely dormant and apparently quite dried up.

The hepatic flora in the neighborhood of Stanford University is a very interesting one. There are types of most of the more important groups, and almost without exception the common species develop their reproductive organs in great numbers — indeed in most of our common species one almost never meets with sterile individuals. Besides the liverworts proper, several species of *Anthoceros* occur, two of which are extremely abundant. With the exception of the genus *Sphaerocarpus*, which seems to be annual, all of the species in this neighborhood that have been examined remain alive during the summer, and resume growth promptly with the advent of the autumn rains.

Among the most abundant liverworts of this region are several species of *Riccia*, some of which, like *R. trichocarpa*,* grow in very exposed places, subject to the full force of the sun. Of the higher Marchantiaceae, the commonest species are *Fimbriaria Californica* (*Asterella Californica*) and *Targionia hypophylla*. Less common are *Fimbriaria Bolanderi* (*Asterella Bolanderi*) and *Cryptomitrium tenerum*.

In the moist forests of the outer coast ranges, and sometimes straying down the banks of the streams, occur the cosmopolitan *Marchantia polymorpha* and *Fegatella conica* (*Conocephalum conicum*). It is doubtful, however, whether either of these species can survive such complete drying up as that which the characteristic species of the valley regularly undergo.

The number of leafy liverworts is relatively small. The commonest species are *Porella Bolanderi* and *Frullania Bolanderi*, both of which are abundant.

Two species of *Sphaerocarpus* and one of *Fossombronia* — *F. longiseta* — represent the thallose Jungermanniaceae.

The Anthocerotaceae comprise two common species of *Anthoceros*, *A. fusiformis* and *A. Pearsoni*.† Both of these species,

* This is *R. hirta* of the writer's "Mosses and Ferns."

† *A. laevis* of "Mosses and Ferns."

like the other liverworts, regularly survive the summer in a dormant state. A former erroneous statement ("Mosses and Ferns," p. 117) that they are annuals, was due to a failure to examine the plants early enough in the season.

Having observed how soon after the first rains mature reproductive organs were present, it was thought advisable to investigate the condition in which the plants pass the dry season. The matter was intrusted to one of our students, Mr. H. B. Humphrey, who has made a careful examination of *Fossombronia longiseta* and *Fimbriaria Californica* (*Asterella Californica*), as well as a less complete examination of a number of other species.

It was found that a surprisingly large amount of the thallus remains alive, and within a few hours after the dried plants are supplied with water, the forward part of the thallus has assumed its active condition and begins to grow. In both *Fossombronia* and *Fimbriaria* (*Asterella*) the first antheridia were mature in about two weeks. This early development of the reproductive organs at once raised the question whether they might not begin their development before the close of the growing period in the spring. To determine this point, dried plants were collected and placed in water and were examined as soon as they had revived. In *Fossombronia* both archegonia and antheridia were found in advanced stages of development, while in the dioecious *Fimbriaria* (*Asterella*) the male plants showed large antheridia, but the female plants had not yet formed archegonia. It is highly probable that the reproductive organs are present also in all the species of *Riccia*, and not unlikely in some of the other genera, but as yet none of these have been critically examined for this point.

That the liverworts can endure much greater desiccation than that to which they are normally subjected was shown by removing by artificial means a large part of the water held in the dried thallus. The plants so treated showed no apparent loss of vitality, and promptly revived when supplied with water.

In all the forms examined, more or less perfect devices for preventing excessive loss of water have been noted. The growing point is protected by hairs or scales, sometimes secreting mucilage, and the mucilage cells within the thallus of certain species

are probably concerned with water storage. How far the absorption of atmospheric moisture from fog takes place during the dry season has not been tested, but to judge from the behavior of the lichens of this region, shown by Professor Peirce's experiments, it may well be considerable.

The development of tubers has been observed by various students of liverworts.* A very perfect case is that of the remarkable liverwort, *Geothallus*, discovered some years ago by the writer. This liverwort comes from southern California, where the rainfall is much less than in middle California. In this species the inner tissue of the thallus becomes filled with reserve food, and the surrounding cells become dark and thick-walled, forming a sort of rind protecting the central tissue. These tubers are more or less completely buried in the earth, where they remain during the long dry season. Only a very small amount of tissue about the growing point remains alive, and no signs of the young reproductive organs are visible when the tubers begin to germinate. A similar condition, but much less pronounced, is sometimes found in *Fossombronia*, this being decidedly more marked in specimens from the southern part of the state.

Goebel† mentions the formation of tubers in several species of *Anthoceros*, and they have also been observed in some Californian species.‡ The thallus of *Anthoceros* develops an unusual amount of mucilage within its tissues, and this undoubtedly is an important factor in their survival of the dry season. Whether the association of colonies of *Nostoc*, which always are present, is of service in water storage has not been determined; but it is by no means unlikely.

Some of the Californian pteridophytes behave much as do the liverworts. Such species of *Selaginella*, as *S. Bigelovii*, and *S. lepidophylla*, dry up during the greater part of the year, but absorb water through their leaves, and resume the active condition very promptly. The latter species is the "resurrection-

* See Howe, Hepaticæ and Anthocerotes of California, Mem. Torrey Club, 7: 69. 1899.

† Organographie der Pflanzen. Zweiter Theil. Heft. 1, p. 293.

‡ Howe, *l. c.*

plant," occasionally offered for sale as a curiosity. *S. rupestris* probably behaves in the same way.

In the neighborhood of Stanford University, a common fern is *Gymnogramme triangularis*, commonly known as "gold-back fern," from the yellow powdery secretion on the lower side of the leaf. This fern dries up in summer without the leaves dying down as they do in most ferns during the resting season. If a leaf from such a dried-up specimen is placed in water, it will in a short time absorb water through its superficial cells, and soon becomes fresh and active. That this absorption of water is by the lamina of the leaf, and not through the petiole, may be shown by placing the dry leaf in water with the cut end of the petiole completely out of water. The leaf will soon become turgescent although it is quite impossible that any water could have been taken up through the cut end of the petiole. Large prothallia of this species (and perhaps of some other ferns) are often met with in the autumn, before there possibly can have been a development of these from germinating spores. To test the ability of the prothallium to endure complete drying up, Dr. Peirce made a culture from spores of *Gymnogramme* in the laboratory, and the prothallia thus grown were allowed to remain entirely dry during the whole summer of 1903. These were given water in the fall and proved to have survived the summer perfectly, numerous young plants developing later from these prothallia of the former season.

Goebel* has recorded from an allied fern *Anogramme*, of Southern Europe, perennial prothallia which develop tuberous structures not unlike those of certain liverworts. Whether any of our native ferns develop similar structures remains to be seen.

Some years ago, the writer received from San Diego, plants of a *Selaginella* — probably *S. Bigelovii* — with the earth in which they had grown. The latter contained a good many spores that had fallen from the plants, and earth, which had been kept dry through the summer was well watered and in a very short time young plants appeared. Unfortunately, none of the ungerminated

l. c., p. 426.

spores had been kept, so that it was impossible to determine beyond doubt, whether germination had begun and the embryo had been already partially developed before growth had stopped in the spring. In view of these later observations on fern prothallia, this is by no means improbable, and if this should be the case, heterospory in *Selaginella* would be advanced one step further in the direction of seed-formation.

It is certain that further examination of the archegoniates of our arid and semi-arid regions will reveal other adaptations quite as interesting as those already recorded.

Stanford University,
March, 1904.

THE POLLEN TUBE IN THE CUCURBITACEAE AND RUBIACEAE

By Francis E. Lloyd

In a recently published paper * Longo has given us the very interesting results of his later investigations on the behavior of the pollen tube in the Cucurbitaceae. The close similarity of the facts presented by Longo to those which have been observed by myself in Rubiaceae,† and the parallelism of our conclusions, will, perhaps, warrant a brief comparative statement of our results.

According to Dr. Longo, the ovary in *Cucurbita Pepo* L. is provided with a special conductive tissue which arises, by tangential cell-division, "from the epidermis of the placental ridges and extends uninterruptedly from the style, through the three central laminae, to the ovule." The placentae, of course, fuse along their surfaces with one another, so that the layer of conductive tissue between any two of them is derived from two epi-

* Longo, B. Ricerche sulle Cucurbitaceae e il significato del percorso intercellulare (endotropico) del tubetto pollinico. R. Accad. Lincei, Va, 6 : 523–547. *pl. 1–6.* 1903. ["Presented in December, 1902." Bot. Centralb. 95 : 114. 1904.]

† Lloyd, F. E. The Comparative Embryology of the Rubiaceae. Memoirs Torrey Botanical Club, 8 : 27–112. *pl. 5–15.* 15 F 1902.

dermal cell-layers, and is continuous transversely, as well as longitudinally.

The tissue consists, moreover, of small sub-isodiametric cells, rich in contents, and *not lengthened in any direction* in particular. They lack, therefore, the anatomical characters found generally in stylar conductive tissues, and are in form, at least, like the cells which lie in portions of the path of the pollen tube in *Casuarina*, certain Amentiferae, *Alchemilla* and in a number of other plants.*

The conductive tissue is further extended between the ovules, being interrupted by their funicles, and comes *to abut upon their nucelli*. This is brought about by the circumstance that in *Cucurbita Pepo* the nucellus has the shape of a flask, the long neck of which extends through and protrudes beyond the micropyle, its end coming into contact with the conductive tissue. It thus comes about that there is, in this species, *no free locular space*, but rather a continuous stretch of conductive tissue from the stigma to the embryo sac. What would be inferred, namely, that the pollen tube must therefore have a completely intercellular course, is indeed the case, as Longo has demonstrated.

In the other genera studied, on the other hand, *e. g.*, *Citrullus vulgaris*, Schrad. (which Longo figures), the nucellus has but a short neck, which leaves open a micropylar canal of considerable extent. From these, too, is absent the conductive tissue described for *Cucurbita Pepo*, there being instead an ovarian space. Through this, and through the micropyle, the pollen tube grows freely in its path to the nucellus, where, however, as in many other plants, it must enter upon a short intercellular course in order to reach the embryo sac. It thus appears that, *in two closely related genera in the same family, and indeed in different species of the same genus, the pollen tube differs in its behavior, in that, in the one case its course is throughout intercellular, while in the other it moves freely in a cavity.*

In every other species of this genus, *Cucurbita*, the nucellus is too short to reach quite up to the conductive tissue (*e. g.*, *C. maxima*, *ficifolia*, *foetidissima*) and in these, the pollen tube

* For citations of the pertinent literature, see either of the papers above indicated.

moves freely in the cavity thus formed in reaching the nucellus.

There are, in addition to the above, some further details of interest in regard to the pollen tube. Its path, as described by a number of observers for other plants, lies between the cells of the conductive tissue in all cases. In *Cucurbita*, upon reaching the base of the neck of the nucellus, it enlarges to form a "bulla" of considerable size. Furthermore, this bulla in some cases produces lateral cul-de-sacs, which extend into the surrounding tissues, after the manner of the lateral suspensor tubes in certain orchids * and in the Galieae among the Rubiaceae.† It further appears that the production of these lateral outgrowths of the "bulla" is correlated with the supply of starch in these surrounding tissues, since, when starch is absent, none are formed, and when abundantly present, the tubes are most extensively developed. Their use, therefore, according to Longo, is to reach out after food materials, which he believes are then passed on to the embryo, as a nutritive supply for its growth.

The conclusion that there is a correlation between the growth of the bulla and the presence of starch, the extent of the former being in direct proportion to the presence of the latter, appears to be supported by Longo's observation that, when pollen grains are grown upon gelatine, bullae are formed, while, when they are allowed only moist air, they fail. These results are analogous to those of van Tieghem obtained for *Ricinus* and *Symphytum*. Van Tieghem, however, used gum arabic instead of gelatine. In *Elodea Canadensis*, however, according to R. B. Wylie, ‡ the pollen tubes which enter the ovarian cavity sometimes fail to reach the micropyle, and these produce "cystoids" which are usually found to be quite free in the locule. Wylie further notes that these "cystoids," which, it would seem, so far as we can at present see, are not different from the structures observed by Longo and van Tieghem, are never produced in the tissues,

* Treub, M. Notes sur l'embryogénie de quelques Orchidées. Naturk. Verh. K. Akad. 19: —. 1879.

† Lloyd, F. E. *Op. cit.*

‡ The Morphology of *Elodea Canadensis*. Bot. Gaz. 31: 1–22. Ja 1904.

where, without doubt, food materials occur in greater abundance, however little their actual amount, than in the ovarian cavity. We must therefore conclude, in the absence of further evidence that this behavior may not wholly be determined in the manner asserted by Longo.

In discussing the facts above outlined, Longo draws the following conclusions:

1. The behavior of the pollen tube in following an intercellular path is not connected with its inability to grow freely in an open space. This is to be inferred from the fact that in closely related species the behavior in this respect is different according to the continuity of the conductive tissues. Longo has completely demonstrated the truth of his contention, by showing that the pollen of *Humulus Lupulus* L., and of *Cannabis sativa* L.,* in all of which the pollen tube has an endotropic course, germinates in humid air, and pollen tubes are produced. Experimental evidence was obtained in the case of the pollen of certain gymnosperms (*Picea excelsa*, three spp. of *Pinus*) which also germinated and produced tubes in moist air, from which he correctly inferred that the endotropic behavior in angiosperms cannot be due to an inheritance of this trait in the gymnosperms, as was pointed out by Murbeck.† Clearly, we must, as Longo maintains, abandon the position that the phenomena of ectotropism and endotropism are quite distinct from each other.

2. Chalazogamy is not primitive in the angiosperms, and this, or in general, the intercellular behavior, is a later phenomenon, and in this, Longo differs from Treub and Nawaschin, but agrees with Murbeck, who regards such behavior as a physiological peculiarity, and of no meaning from a phylogenetic point of view.‡

3. In plants in which the pollen tube is endotropic, the direction of its growth is determined by the presence of a special substance to which it responds chemotactically. This, Longo adds, is developed within the tissues when the course is endotropic

* Longo, R. *Op. cit.*, p. 21.

† Murbeck, Sv. Ueber das Verhalten des Pollenschlauches bei Alchemilla arvensis. Lands. Univ. Arsskrift, 36: 9. 1901.

‡ Murbeck, Sv. *Op. cit.*

and on their surfaces when the course is superficial. This conclusion is drawn from the circumstances that the pollen tubes of *Humulus* and *Cannabis*, when growing upon a cover-glass in humid air, are indeterminate in the direction of their growth.

We may now turn to the facts concerning the behavior of the pollen tube in the Rubiaceae. The plants which offer these are *Richardsonia pilosa*, *Diodia teres*, and *D. Virginiana*. The ovary in *Richardsonia* is trilocular, in *Diodia*, bilocular. In all three there is a single ovule in each locule, and this is inserted at the top of the basal element of the partition which separates the locules. This partition reaches to the middle height of the ovary, and the separation of the locules from this point on is completed by the stylar elements. The latter has a conductive tissue of elongated cells, which extends to its point of fusion with the basal element of the partition. Up to this point in all three the course of the pollen tube is direct and endotropic. After this, however, it is quite different, in *Richardsonia* and *Diodia teres* on the one hand, and *D. Virginiana* on the other. The ovule in *Diodia Virginiana* has a tract of epidermal conductive cells which are cubical in form, on the outer surface of which is secreted a mucilaginous substance. On the surface of these cells, the pollen tube moves freely till it reaches the micropyle, which it enters and traverses till it reaches the embryo sac. The conductive tissue is confined to a strophiolar outgrowth of the ovule.

In *Richardsonia* and *D. teres*, however, the ovules are provided with a conductive tissue of deeply columnar epidermal cells, with dense protoplasmic contents, and thick but soft and yielding walls. There is, however, no mucilaginous secretion to be found upon their exposed ends. In these plants, the course of the pollen tube is always (*Diodia teres*) or nearly always (*Richardsonia*) completely endotropic. The pollen tube grows between the epidermal cells, as in the Cucurbitaceae, and follows a direct path toward the micropyle at right angles to the direction of least resistance. Aside from the latter fact, we have, it is seen, *two closely related genera, and two species of one of these, in which the behavior of the pollen tube is different, in that, in one species the course is ectotropic, and in the two others, distributed in different genera, the course is endotropic.*

The following conclusions have been inferred by me from the above observations:

1. The form of the cells which compose a conductive tissue can have no importance in directing the pollen tube, though they may deflect it here and there in its course. This is clear from the circumstance that we have in two of the species studied, a conductive tissue, the cells of which are elongated at *right angles to the path* of the tube. We must therefore conclude that the guidance of the pollen tube through the tissue is due to a chemotactic stimulus, thus confirming the view of Molisch and with which Longo finds agreement. In order, however, to determine *direction*, the stimulant must, I have maintained, be distributed differentially, from a center toward which, therefore, the pollen tube must grow. I now believe that the egg cell is the origin of this substance.

2. The behavior of the pollen tube, whether ectotropic or endotropic, is a purely physiological character. When the mechanical conditions make it necessary, as, *e. g.*, in *Cucurbita Pepo*, and as I have shown in *Diodia teres*, the path of the pollen tube is wholly endotropic; when, however, there is a free space to move in, this may be used by the pollen tube, or if the distribution of the chemotactic stimulant is otherwise, the free space may be avoided. By inference, the phylogenetic interpretation of endotropism advanced by Treub and Nawaschin is of no further importance.

For other facts and conclusions, less relevant to our present purpose, the reader may be referred to the original papers. It is of no small interest that almost precisely parallel facts have been brought to light independently by two different observers, and that, equally independently, the same significance has been attached to these facts.

SHORTER NOTES

Evening Primroses. — The evening primroses (*Onagra* or *Oenothera*) are the center of an unusual interest at the present time because of the new species which have been seen to arise

from *O. Lamarckiana* by Professor de Vries. The undersigned wishes to secure preserved specimens and ripe seeds of any form with large flowers, growing wild or in cultivation, east of the Mississippi river. Any information or coöperation which will enable me to secure this material for experimental purposes will be gratefully received.

D. T. MacDougal.

New York Botanical Garden.

Teratology of Seedling Bean. — The seedling lima-bean figured is remarkable in that it possesses three cotyledons with a dextral phyllotaxy, the unpaired one being the lowest. All are of the usual size and apparently perfectly functional. The hypocotyl is of the usual length and thickness. The first node is swollen and bears three equally developed and functional leaves with coalesced petioles which form a tube slit down one side, from which the growing point protudes at a right angle to the stem. The seedling shows the same relative proportions as normal seedlings planted at the same time; each leaf is just as large, and if anything the whole plant is more vigorous than usual. Abnormalities often offer morphological or phylogenetic hints of value, the most obvious one in this case being that botanists in all probability have been attaching too much importance to the number of cotyledons. Three cotyledons have been previously recorded in this genus according to Coulter (1903) and Braun in his Pflanzenmissbildungen (1869) mentions numerous other dicotyledons which occasionally possess three cotyledons.

Edward W. Berry.

Passaic, New Jersey.

Scirpus Coloradoensis sp. nov. — Annual, uliginous, similar to *Scirpus nanus;* culms tufted, filiform, 4 cm. high or less. Spikelet solitary, ebracteate, linear-oblong, acutish, 3–5 mm. long, about 2 mm. thick: scales lanceolate, acutish, the keel green, bordered by two brown bands, the margins scarious: stamens apparently two: bristles none: achene brown, obovate, 1 mm. long, trigonous, narrowed at the base, the apex scarred by the base of the deciduous style, the surface finely papillose, the papillae arranged in irregular transverse lines.

Shore Lake, Larimer County, Colorado, *J. H. Coxen*, July 21, 1896.

This species differs from *S. nanus* in the darker scales, the absence of bristles, and the darker colored papillose achene, the achene of *S. nanus* being finely longitudinally lined.

N. L. Britton.

PROCEEDINGS OF THE CLUB

April 12, 1904

The meeting was held at the New York College of Pharmacy, with Dr. MacDougal in the chair. The name of Miss A. Irva Lee Kuter, 1264 Lexington Avenue, New York City, was presented by the nominating committee and she was elected to active membership in the Club.

The first paper of the evening was by Professor L. M. Underwood on "*Cyathea* and its allies in Jamaica." One of the objects of Professor Underwood's trip to Jamaica last year was to study the tree ferns in the field. Specimens usually show a single pinna without its connections or any part of the caudex. Such material has been used for types and one species has been described from a single pinnule. Although a species which is well known can often be recognized by a fragment of a good specimen, it should show as much as possible of a pinna, its connection with the main rachis, and part of the caudex.

The Cyatheaceae or tree ferns mostly have an elongated caudex or trunk but a few are herbaceous. The more distinctive family characters are furnished by the sporangia, which are rounded-triangular with complete ring and are sessile or very

shortly stalked. There are six genera in the West Indies, distinguished by the character of the indusium, habit and cutting of the leaves.

Cyathea arborea is the oldest and best known of the West Indian tree ferns, and the only one common to most of the islands, many of the species being found only on the islands on which they were originally described. It occurs at an elevation of 1,000 to 2,000 feet and forms a handsome tree with a spread of 14 to 18 feet. Above this it is replaced by a similar but larger species of *Alsophila*. *Cyathea arborea* and *C. elegans* are noticeably distinguishable by the caudex, that of the former being smooth while that of the latter is very rough and shaggy. *C. nigrescens* is common to Jamaica and Cuba. *C. insignis* is a handsome plant, but as only two were seen, and these represented, perhaps, 200 years growth, they were not taken for specimens, but notes were made on the trunk characters. A fine specimen, brought by Professor Earle, is in cultivation at the conservatory of the Botanical Garden. Of the 16 species of *Cyathea*, which are not doubtful, 13 are endemic in Jamaica; three are known only from type specimens. The sharp prickles of these and other species secrete a poison, and wounds from them are very painful, so that collecting on the steep hillsides is likely to be attended with considerable discomfort. The genus *Alsophila* has three species which are well known. *A. armata*, occurring at 4,000 to 5,000 feet elevation, has a usual height of 40 to 45 feet and is the most graceful plant of the island. It is armed only with weak bristles. *Alsophila aspera*, which is a lower tree, has smooth leaves but prickly petioles. It occurs at about 1,500 feet elevation. Two of the species are endemic. *Hemitelia* has one species described early in the last century, which is probably extinct and two others very little known.

A species of *Lophosoria* has a dense bloom on the under side of the leaves and is somewhat xerophytic in habit. It has merely a woody base.

Cnemidaria is distinguished by its habit and the cutting of its leaves. It has veins uniting near the midrib to form meshes.

Amphidesmium, with one herbaceous species from Trinidad and South America, differs from all other ferns in that the veins bear a second or even third sorus.

Most of the species discussed were illustrated by herbarium specimens and by portions of their trunks.

The second paper was by Dr. P. A. Rydberg on "The Flora of Northwest America." A general discussion of the manuals available for the identification of the plants of different parts of the United States was given, and a review of Mr. Howell's flora of the Columbia River region. The paper is soon to be published.

William T. Horne,
Secretary pro tem.

NEWS ITEMS

Guy N. Collins, of the Bureau of Plant Industry, Washington, is in Jamaica, investigating and photographing economic plants.

O. F. Cook, of the Bureau of Plant Industry, is in Guatemala, engaged in studies of rubber and other economic plant-products.

Professor Francis E. Lloyd lectured on May 6 before the American Philosophical Society at Philadelphia on "The Vegetation of the Island of Dominica."

Willard W. Eggleston, C.E., of Rutland, Vermont, has been appointed a museum aid at the New York Botanical Garden, beginning work on June 1.

William R. Maxon, of the U. S. National Museum, sailed for Jamaica on May 14 with the purpose of making collections, especially of ferns, in the John Crow Mountains.

At the May meeting of the Board of Managers of the New York Botanical Garden, Dr. W. A. Murrill was elected assistant curator in place of Professor F. S. Earle, resigned, and Dr. D. T. MacDougal was advanced to the rank of assistant director.

Marshall A. Howe, assistant curator of the New York Botanical Garden, expects to sail for England on June 4. He is commissioned by the Garden to visit European museums and herbaria with special reference to studying collections of marine algae. Until September 15, manuscript intended for publication in Torreya may be addressed to Dr. John Hendley Barnhart, New York Botanical Garden, Bronx Park, New York City.

An important and practical bulletin of the Bureau of Plant Industry of the U. S. Department of Agriculture has recently been issued under the title of "A Method of destroying or preventing the Growth of Algae and certain pathogenic Bacteria in Water Supplies," the authors being Dr. George T. Moore and Mr. Karl F. Kellerman. The following statements are quoted from the authors' summary: "It has been found that copper sulphate in a dilution so great as to be colorless, tasteless and harmless to man, is sufficiently toxic to the algae to destroy or prevent their appearance. The mode of application makes this method applicable to reservoirs of all kinds, pleasure ponds and lakes, fish ponds, oyster beds, water-cress beds, etc. It is also probable that the method can be used for the destruction of mosquito larvae. At ordinary temperatures 1 part of copper sulphate to 100,000 parts of water destroys typhoid and cholera germs in from three to four hours. The ease with which the sulphate can then be eliminated from the water seems to offer a practical method of sterilizing large bodies of water, when this becomes necessary." Reservoirs have been successfully treated by towing the copper sulphate in a coarse bag from the stern of a row-boat. A solution of 1 part of the sulphate to about 50,000,000 parts of water has been found fatal to *Spirogyra* and a 1 to 4,000,000 solution appears to be destructive to the blue-green algae.

The Philadelphia Botanical Club and the Torrey Botanical Club will hold a joint field meeting at McCall's Ferry, Pennsylvania, in the valley of the Susquehanna River, July 2 to 9, 1904, which all botanists are cordially invited to attend. Excursions will be made from this point as a center, to points in the vicinity, returning each day; botanists can therefore conveniently take part in the meeting by arriving at McCall's Ferry any afternoon during the week. Informal evening conferences will be held for the discussion of topics that may be brought forward. Fares to McCall's Ferry are as follows: Philadelphia to McCall's Ferry and return, $3.36; New York to McCall's Ferry and return, $6.96; Washington to McCall's Ferry and return, $4.06. Hotel charges at McCall's Ferry are $1.25 per day. Guides: Messrs. Stewardson Brown and Jos. Crawford.

Vol. 4 No. 7

TORREYA

July, 1904

ADDITIONS TO "THE FLORA OF LONG ISLAND"

By Smith Ely Jelliffe

In the Flora of Long Island, published by me in 1899, I expressed a wish that some students who were working on special branches might be able to fill out and complete the list that was then presented. I have been favored from time to time by contributions from various sources, and desire to express my sincere thanks to those who have thus assisted me.

In Torreya for April, 1902, Dr. A. J. Grout published a very full list of additions to those enumerated in my Flora, which very materially extended it. At the present time it gives me pleasure to report upon two contributions, one made by Dr. Hulst just before his death, containing some of the plants not included in Dr. Grout's list, and some additions by Mr. D. N. Shoemaker found about Cold Spring Harbor. Mr. Shoemaker's list is particularly valuable in respect to the lower plants.

It was confessed that the first list represented the lower forms very imperfectly, and it seems to me worth while to call the attention of botanical students to the interest that a study of such a restricted district might take on upon further investigation.

As noted in the former list the lichens are not at all represented, and there is unquestionably a field for the study of rock and bark lichens which has not as yet been cultivated. Very few additions have been made to the algal forms, although there is little doubt that those enumerated in my Flora represent a very small proportion of those actually growing in the fresh and salt waters of the island.

[Vol. 4, No. 6, of Torreya, comprising pages 81–96, was issued June 8, 1904.]

MYXOMYCETES (by Daniel N. Shoemaker)

Enteridium Rozeanum Wing.
Cribraria pyriformis Schrad.
aurantiaca Schrad.
languescens Rex.
microcarpa (Schrad.) Pers.
minutissima Schwein.
tenella Schrad.
Arcyria punicea Pers.
flava Pers.
ferruginea Sauter.
Trichia affinis de Bary.
Enerthenema elegans Bowm.
Lamproderma arcyrionema Rost.
Comatricha obtusata Preuss.
caespitosa Sturgis.
lurida List.
Stemonitis Smithii Macbr.
pallida Wing.
Didymium farinaceum Schrad.
Didymium nigripes Fries.
effusum Link.
Diachea elegans Fries.
Chondrioderma spumarioides Rost.
testaceum (Schrad.) Rost.
reticulatum Rost.
Leocarpus vernicosus Link.
Physarum nutans Pers.
globuliferum (Bull.) Pers.
tenerum Rex.
bivalve Pers.
viride Pers.
leucopus Link.
calidris List.
virescens Ditm.
nucleatum Rex.
Badhamia lilacina (Fr.) Rost.
rubiginosa (Chev.) Rost.

RHODOPHYCEAE (by D. N. Shoemaker)

Chantransia virgatula (Harv.) Thuret.
Halosaccion ramentaceum (L.) J. Ag.

ASCOMYCETES (by D. N. Shoemaker)

Hypocrea rufa (Pers.) Fries.
Geoglossum hirsutum Pers.
Peziza pustulata Pers.
Lachnea coccinea Jacq.
Bulgaria inquinans Fries.
Helotium subsessile Schum.

BASIDIOMYCETES (by D. N. Shoemaker)

Polyporus dryophilus Berk.
pubescens Schum.
flavo-virens B. & Rav.
Hydnum zonatum Batsch.
adustum Schw.
Simblum rubescens Gerard, first described from Long Island.
Dictyophora phalloidea Desv.

MUSCI

Fontinalis antipyretica gigantea (Sulliv.) Sulliv. Valley Stream, *Hulst.*

PTERIDOPHYTA

Botrychium obliquum Muhl. Betts Creek, Brooklyn, *Hulst.*

Uvularia grandiflora J. E. Smith. Betts Creek, Brooklyn, *Hulst.*

Narcissus poeticus L., found in woods on Shelter Island. Probably roots thrown out there. *Hulst.*

Coeloglossum bracteatum (Willd.) Parl. Wading River.

Rumex persicarioides L. Montauk.

Polygonum lapathifolium L. Maspeth.

P. littorale Link. New Lots, along Salt Marshes, *Hulst.*

Roubieva multifida (L.) Moq. Brooklyn, *Hulst.*

Atriplex patula L. Rockaway, *Hulst.*

Silene Cucubalus L. Forbells (escaped), *Hulst.*

Delphinium Ajacis L. Woodhaven (escaped), *Hulst.*

Brassica Napus L. Woodhaven, *Hulst.*

Barbarea stricta Andrz. Flushing, *Hulst.*

Cardamine Pennsylvanica Muhl. Forbells, *Hulst.*

Berteroa incana (L.) DC. Rockaway Beach, Milburn.

Rubus Americanus (Pers.) Britton. Cypress Hills, *Hulst.*

R. setosus Bigel. Jamaica South, *Hulst.*

R. Baileyanus Britton. New Lots, *Hulst.*

Potentilla intermedia L. Flushing, *Hulst.*

Rosa cinnamomea L. Jamaica (escaped), *Hulst.*

Pyrus communis L. Jamaica, often found, *Hulst.*

Prunus Avium L. Jamaica, *Hulst.*

Lespedeza frutescens (L.) Britton. Jamaica, *Hulst.*

L. Nuttallii Darl. Cypress Hills, *Hulst.*

Acalypha gracilens A. Gray. Cypress Hills, *Hulst.*

Buxus sempervirens L. Planted about old foundations, *Hulst.*

Euphorbia maculata L. Brooklyn, *Hulst.*

Mercurialis annua L. Common around Erie Basin and permanent, *Hulst.*

Vitis cordifolia Michx. Winfield, *Hulst.*

Hypericum adpressum Bart. Hempstead.

Viola Brittoniana Pollard. Forbells, *Hulst.*

V. ovata Nutt. Woodhaven (?), *Hulst.*

Apium graveolens L. Queens County, *Hulst.*

Apocynum hypericifolium Ait. Coney Island, *Hulst.*

Asclepias decumbens L. New Lots, *Hulst.*

A. pulchra Ehrh. Forbells, *Hulst.*

Acerates viridiflora Ivesii Britton. Woodhaven, *Hulst.*

Heliotropium Europacum L. Cultivated fields near Betts Creek, *Hulst.*

Limosella aquatica L. Cold Spring, *Shoemaker.*

Plantago eriopoda Torr. Brooklyn, *Hulst.*

Galium palustre L. New Lots, *Hulst.*

Lonicera Japonica Thunb. Cypress Hills, etc., *Hulst.*

Picris echioides L. Brooklyn, *Hulst.*

Hypochaeris radicata L. Cedarhurst, Milburn-Jahn, *Hulst.*

Leontodon hastile L. Milburn-Jahn.

Malacothrix sonchoides (Nutt.) T. & G. Milburn-Jahn, *Hulst.*

Hieracium murorum L. Lloyd's Neck, Northport, *Hulst.*

Acanthospermum humile (Sw.) DC. On ballast, Gowanus, *Hulst.*

Aster Lowrieanus Porter. Richmond Hill, *Hulst.*

Brauneria purpurea (L.) Britton. One specimen at Richmond Hill, accidental.

Other additions have been as follows :

Clitocybe Geotropus Bull. Glen Cove.

Polytrichum juniperinum alpinum Schimp. *Miss M. L. Saniel.*

Centaurea Jacea L. East Hampton, *Mrs. L. D. Pychowska.*

Rhexia Mariana L. East Hampton, *Mrs. L. D. Pychowska.*

This makes an addition of 180 plants, including Dr. Grout's list, to those reported in my Flora, the total number now being 2,418 species. Further contributions would be welcomed.

64 West 56th Street, New York.

A COLLECTING TRIP TO HAITI

By George V. Nash

During the past summer I spent about five weeks in the Republic of Haiti, which occupies the western third of the island

of the same name. The population is estimated at about 1,300,000, all negroes, with the exception of a few mulattos and white men.

The portion of the island visited by me, a small area in the northwestern corner, is the most inaccessible section. It can only be reached on horseback, and over roads that, at times, appear almost impassable. They were but trails, and led through valleys, over mountains, and across rivers and brooks, which had to be forded repeatedly, for there are no bridges. It required being in the saddle from daylight to dark, and a day's journey through such rough country made supper and an early bed most delightful.

We, my assistant and myself, were the guests of my friend, Mr. A. E. Casse, at Bayeux, a plantation about eighteen miles west of Cap Haitien, and located near the seashore. An island but a short distance from the shore and a projecting point of the mainland make a very good harbor, and here my friend keeps his motor boat anchored. This boat is used to communicate with the Cape, as Cap Haitien is locally called, and several trips are made each week. The only other means of communication is on horseback, a long and devious journey of about fifty miles, requiring about six hours for its accomplishment, if you ride fast. A cable to New York has its terminus at the Cape, but as the toll is $1.10 per word, including address and signature, any extensive communication by this means becomes rapidly expensive. But having the cable so near at hand, only eighteen miles by boat, about three hours in time, made us feel that we could receive messages from the outside world and communicate with home if we so desired.

The plantation at Bayeux was made our headquarters, and from this place trips were made into the mountains of the interior occupying several days each — one trip required ten days for its completion. The country at and about the plantation is flat, with a few low hills in the rear, and the flora is, for the great part, that which prevails throughout the West Indies. The strand flora was of course that common on such shores. The beach morning-glory (*Ipomoea Pes-caprae*), the sea-grape (*Coc-*

colobis Uvifera), a species of spider lily (*Hymenocallis*), and one of prickly pear (*Opuntia*), prevailed.

Where the sea penetrated into the low flat lands, mangrove swamps were found. They are always weird, their great straggling roots, like vast spiders, clamber in all directions; and this weirdness was but intensified by the almost absolute quiet on a still day, the silence only broken by the rustling of the crabs, as they grotesquely sidled along these roots, looking at one with their unwinking bead-like eyes, as if resenting this untoward invasion of their domain.

Several species of the genus *Ficus* are found in these low lands, and the star-apple (*Chrysophyllum Cainito*) was of common occurrence, with its beautiful leaves upturned by the breeze, exposing the silky brown felt of the lower surface. It is a pity this tree is not hardy in our climate, for it would be a great addition to our arborescent decorations. Its fruit is edible and wholesome.

Banana fields were everywhere on the plantation, the bananas serving as temporary shade for the rubber trees (*Castilloa elastica*) and the chocolate tree (*Theobroma Cacao*). These are planted in rows, the chocolate trees predominating, the rubber tree, the much taller grower of the two, eventually forming permanent shade for its smaller neighbor. The bananas are planted in rows between. Their fruit is being largely used at present in the manufacture of desiccated bananas, which are being sent in considerable quantities to Europe.

Sugar cane is also grown and its juice manufactured into rum and tafia, a poor quality of rum. The intoxicating effects of either are vigorous in the extreme, and when it is understood that tafia can be had for a few cents a gallon, the ease with which a good sized debauch may be had can be appreciated. Mangos, avocado pears and other tropical fruits grow plentifully on the plantation, and rice is cultivated to some extent.

This region about the plantation was pretty thoroughly collected, and, as was to be expected, yielded but few things which were not of general distribution. But as one leaves this low country and ascends to the mountains in the interior, great changes are noted in the vegetation. All the characteristic plants

of the coast are soon left behind and an entirely new flora takes their place. Ferns become more numerous the higher one ascends, and at about 2,000 feet tree ferns make their appearance, and in deep shaded places a few filmy ferns may be found. It is not until about 3,500 feet are attained that these become plentiful, and then they clothe everything, tree trunks, rocks, soil, all surfaces in fact, are covered with them; and to the beauty of these is added also the delicate tracery of the moss and hepatic. At this elevation everything is dripping moisture, for the summits of all these mountains are bathed in clouds every afternoon and toward evening daily showers prevail, and such showers as they are! We were caught in one of them and for two hours we ploughed through mud and rain, soaked to the skin.

We traveled many miles through rank tropical verdure, and at last, away up in the mountains at a place called Marmelade, we came upon the pine forest, about which we had heard so many reports, and which was in fact our objective point on this long trip into the interior. To come suddenly, as we did, upon these trim stately pines, clothing the steep mountain side, was so great a change, that one could hardly realize that it was the same land, and that by turning ones back miles of tropical vegetation could be seen in the rear. The change in the character of the accompanying plants was equally as marked. Shrubby composites, melastomads in great number, and even an agave, with flowering stems 6–8 feet tall, became the common order of things. The undergrowth in the portion of the pine land visited by us was very dense, and traversing it, other than by the trails, was an extremely difficult task and very tiresome.

As in the other villages in which we stopped, here at Marmelade we were entertained by the Catholic priest. The lives of these men, frequently the only white men in the villages over which they preside, must be lonely in the extreme, and they seemed delighted to see us and urged us to come again. We were their guests everywhere, and their open hospitality was gratifying. At this little place many European vegetables are grown, including excellent potatoes, which we sampled; peaches are also raised. The much cooler atmosphere, actually cold at times

we were informed, makes this possible. The air is much less humid and its bracing qualities are soon apparent. A prolonged stay in the low lands during the summer time is very depressing, and we northerners greatly enjoyed the tonic qualities of the mountain air.

One cannot adequately convey the impressions received during a trip of this kind, only a personal visit will do this. The country is a strange one, almost unknown, is dominated by the negro, a condition not existing elsewhere in America, and botanically it is practically a virgin field. It was my first visit to the tropics, so not only was my interest constantly aroused by seeing in their perfection plants which we strive with much care to raise in our conservatories, but added to this was the excitement engendered by exploring a country rarely visited by white men. The inhabitants were generous in the extreme, and hospitable; child-like and simple we found the people of the mountains, as easily angered as a child, and as easily placated, and so with all the child's uncertainties.

SHORTER NOTES

Two-bracted Dogwood. — The effect of the severe winter, just passed, on our native plants would prove an interesting study to one favorably located for its pursuit. The common dogwood, *Cornus florida* L., shows in a most striking manner that it did not escape unscathed. On all the trees examined by me, numbering about a dozen and growing in a variety of situations, nearly all the flower-clusters are subtended by but two normal opposite bracts, the outer pair remaining simply bud-scales or perhaps showing white for a quarter or a half of an inch. In numerous clusters all four bracts have remained undeveloped.

Edward W. Berry.

Passaic, New Jersey, May, 1904.

Savia Bahamensis sp. nov. — A shrub about 2 m. high with ascending branches, similar to *S. erythroxyloides* Griseb. of Cuba. Leaves oblong-obovate, thick, obtuse and rounded at the apex, narrowed at the base, 6 cm. long or less, 1–3 cm. wide, dark green, shining and strongly reticulated above, pale green and in-

conspicuously reticulated beneath; petioles stout, about 5 mm. long, about as long as the dense clusters of staminate flowers: fruit glabrous, depressed-globose, slightly and obtusely 3-lobed, about 8 mm. in diameter.

Thickets, West Street Road, near Nassau, New Providence, Bahamas, *Britton*, no. 84, April 8, 1904 (type); New Providence, *W. C. Coker*, nos. 157 and 160, June 24, 1903; Deep Creek, Andros, *Northrop*, no. 610, June, 1890.

Savia erythroxyloides has leaves nearly equally dark green, shining and reticulated on both sides. N. L. Britton.

Notes on Cuban Plants. — Among the plants collected in Cuba by Dr. and Mrs. Britton and myself in March, 1903, or by me alone in April, are several introduced species that appear as weeds which, so far as I have been able to ascertain, have not heretofore been reported from the West Indies. Two of these are small composites, hailing from Mexico.

Calyptrocarpus vialis Less., a low creeping, apparently perennial plant, although described as an annual, was first observed on the grounds surrounding the historic shrine, Monserrate, at Matanzas. Here it was matted among the low grass on this prominent eminence, attaining its greatest perfection in the shade of the great spreading "laurel" (*Ficus religiosa* L.) but perfectly happy in the more sunny places. Later I found it at Havana, a common weed on vacant lots in the heart of the city, while at the beautiful "Parque Colon" laborers were engaged, on their haunches, pulling it out from among the Bermuda-grass lawns. It was again collected the following August by Britton and Wilson at Cumbre near Matanzas, also from the Isle of Pines in April, 1904, where Mr. A. H. Curtiss collected two small plants in "tobacco beds" at Nueva Gerona.

Dysodia porophylla Cav. A small marigold-like plant with orange-yellow flowers was also first observed near Monserrate, in the taller grass more remote from the shrine and again in the thin soil over the coral rock on the north coast west of Havana, at Buena Vista. Britton and Wilson also collected it at Cumbre. In neither case was it abundant. It is probably of very recent introduction. J. A. Shafer.

PROCEEDINGS OF THE CLUB

THURSDAY, APRIL 27, 1904

This meeting was held in the museum building of the New York Botanical Garden; Dr. H. H. Rusby presided and twenty persons were present.

Mr. O. P. Medsger, 167 Laurel Avenue, Arlington, N. J., was elected a member of the Club.

A report of the committee on increasing the membership of the Club was asked for, and Dr. Rusby, chairman of the committee, reported that the work was to be taken up more actively after the closing of the school year.

The Club voted to support the application of Miss W. J. Robinson for a grant from the Newberry Fund to aid her in the study of Jamaica ferns.

A communication from the organization committee for the International Botanical Congress to be held in Vienna, June 12 to 18, 1905, concerning the number of delegates the Club would send to the Congress was read by Dr. Barnhart. It was moved and carried that the Secretary be authorized to notify the committee that the Club expects to send three delegates.

The first paper of the scientific program was by Dr. N. L. Britton, on "Explorations in Florida and the Bahamas." This was illustrated by maps and specimens, and described the general features of the flora of the region of the part of subtropical Florida south of Miami, to which a visit of three weeks' duration was made in March and early April with Mrs. Britton and Dr. M. A. Howe, in coöperation with Professor P. H. Rolfs of the U. S. Subtropical Laboratory. A detailed account of the flora was not taken up, inasmuch as Dr. John K. Small, who explored the same region last autumn, and who will again visit it in May, proposes to publish a complete account of the material secured. Two genera, new to the continent, both represented in Florida by a single species were discovered, *Alvaradoa*, in hammock lands, and *Sachsia* in pine lands, both of these genera existing also in Cuba and in the Bahamas.

Dr. C. F. Millspaugh, of the Field Columbian Museum, joined

the party early in April and the Island of New Providence in the Bahamas was partially explored. The distribution of plants of this island was described, the littoral zone containing many common West Indian and Floridian species, of which the most characteristic are perhaps the shrubs *Jacquinia Keyensis*, and *Salmea petrobioides*, the latter endemic in the Bahamas.

Between the littoral zone and the interior regions of the island there is in places a plant society, which may be termed an intermediate one, characterized by such shrubs as *Buxus Bahamensis*, *Banara reticulata*, *Calliandra formosa*.

The pine lands (*Pinus Bahamensis*) contain among other species, *Pteridium caudatum*, *Vernonia Bahamensis* and *Byrsonima lucida*, as characteristic species. The palmetto lands (apparently *Inodes Palmetto*) contain more herbaceous vegetation than the other regions, including *Linum Bahamensis*, *Sachsia Bahamensis*, and *Sabbatia campanulata*, though also having a considerable number of shrubs. The "coppets" or "hammocks," as they are called in Florida, are areas devoid of either pines or palmettos and often occupy isolated areas entirely surrounded by pine forests as in southern Florida; characteristic trees of these hammocks are *Dipholis salicifolia*, *Eugenia confusa*, *Icacorea paniculata*, and *Coccolobis laurifolia*, all of which occur in similar situations in Florida.

Dr. C. F. Millspaugh, who was with Dr. Britton and remained somewhat longer, was asked to discuss the paper. He reported that plants found in bloom at the center of the island were found in fruit at the west end, while at the east end, which is dry and rocky, the buds of the same species were scarcely started. South Bemini is much like New Providence in vegetation, though its elevation is less. A *Rhus* resembling *R. toxicodendron* was found on Cat Cay and there is an interesting palm on the same island.

Inquiry was made concerning *Croton Eluteria* which is prized in West Indian countries as a bitter drug but is said to be disappearing. The plant had not been seen but a guide said that it grew on South Bemini.

Professor Underwood called attention to *Odontosoria clavata*, which in Jamaica and Cuba grows in very wet places and is a

soft tender plant, while in the Bahamas what is apparently the same species grows in dry pot-holes and is firmer and stronger.

The second paper was by Dr. D. T. MacDougal on "Desert and Delta Vegetation of Sonora and Baja California." The Colorado river has been called the Nile of America. It flows 600 miles without tributaries and has a delta 150 to 200 miles long by 50 to 100 miles broad. In this region is the most pronounced desert in the United States and probably in America. The topography of the region may be described as a great basin with the Colorado River flowing along the eastern margin. The Salton basin is 400 feet below sea level and in times of unusual flood is transformed into a great lake by overflow of the Colorado river, the last such flood occurring in 1891 when part of the track of the Southern Pacific Railroad was under water. At one point in this basin there has been an elevation of mud volcanoes from 10 to 50 feet high, where there are hot sulphur springs. The dry season is from August to April or May. At the end of the wet season the Indians dig holes deep enough to get into and plant their corn and melons in these. The surface of the ground becomes very dry but enough moisture is retained to mature the crops. Within a few yards of the river-channels relative humidities of 11, 12 or 13 per cent. were observed. The temperature of the summer flood water is 45° to 55° while the air temperatures are the highest to be found in the country, 100° to 125°. At the lower end of the delta is a region of brackish water.

Distichlis spicata is widely distributed on the mud flats; the Mexican poplar, an unidentified willow, and the mesquite were the trees observed, while the arrow-weed forms almost impenetrable thickets. Within the width of a few yards one passes from river vegetation to true desert.

Ammobroma Sonorae, described by Torrey, has a stem 2 to 4 feet long, all buried except the head. It is parasitic on *Atriplex* roots. A puff ball with the same form and similar appearance was found, but it was too brittle to stand carrying.

The east coast of Baja California, near the head of the Gulf, is supposed to be the driest spot in America. One half inch of rain

only has been recorded at Yuma during 1903, and Palmer visited an island in the gulf in 1889 which had had no rain for a year and a half. Landings were made at three points, the farthest at San Felipe Bay, 55 miles below the river. Mr. Brandegee visited San Luis Bay once, but the San Felipe region was entirely unexplored by botanists. Here the coast rises by gradual slope to 500 feet and then by precipitous rocks to peaks, one of which is over 10,000 feet high. The seasons are evidently irregular and not clearly marked. Many of the plants have milky or resinous juice and many are aromatic. *Cereus Schottii* was found forming dense groves near San Felipe. Living plants of what is probably *Cereus Pecten-aboriginum* were brought home. The Indian-comb cactus has a short trunk and long branches in contrast to the usual form of *C. giganteus*.

Although the plants are very sparse it is not to be supposed that they have a harder struggle for existence than others, as is shown by trying to grow them under artificial conditions. *Fouquieria splendens* seems to reach its optimum development in the delta lands. Cactuses with sheathing spines were noted and some of these shed their spines. The flora is not Arizonian. In San Felipe there are no plants with storage organs for there is no surplus of water to store.

In the discussion it was mentioned that the poison cacti are all unarmed.

Professor Underwood remarked on a specimen of the southern brake sent from Burlington, Vermont. This form, described in recent years as *Pteris aquilina* var. *pseudocaudata* by Clute, is the *Pteris latiuscula* Desv., described in 1827.

WILLIAM T. HORNE,
Secretary pro tem.

REVIEWS

Bailey's Plant Breeding.*

Professor Bailey is a teacher in a rare sense and American botany owes much to his abundant, skilful and simple exposition

* **Bailey, L. H.** Plant Breeding. 12mo. Pp. 13 + 334. New York, The Macmillan Co. 1904. [Ed. 3.]

of the evolution theory as applied to the amelioration of plants.

In the book which we have before us the author discusses "The Fact and Philosophy of Variation," "The Philosophy of the Crossing of Plants, considered in Reference to their Improvement under Cultivation," "How Domestic Varieties Originate," and recent opinions, and the investigations of de Vries, Mendel and others. De Vries, himself, contributes a part of the last mentioned chapter, namely, that "On Hybridization," and Mr. Spillman, who has studied extensively the wheat varieties with especial reference to 'mendelism,' gives an account of his experiments which led him to independent results parallel to those of Mendel. Among the illustrations a photograph of the "cage" used by Professor de Vries in his experimental work at Amsterdam helps to bring the reader into a more living touch with this renowned investigator. The final chapter deals with the practical operation of pollination. The book is made necessary to every investigator of these problems, and useful to teachers and others interested, by a very full bibliography of chiefly horticultural writings.

The book is to be particularly recommended as a companion volume to "The Survival of the Unlike" for educational use. Although Professor Bailey confessedly takes a conservative attitude he is eminently fair minded, and states all the aspects of a question dispassionately. His attitude also toward the practical problem of horticulture is clearly and uncompromisingly scientific. The more we know about the behavior of plants, and the closer we follow the indications of nature, the more successful will our efforts be to ameliorate plants. The principle of the scientific method is thus adhered to. In a word, the treatment is such as to make it exemplary for students and teachers, and it should not only be found on every reference shelf from the high school to the university, but at least some portions of it should be required to be studied, as part of general education. This would help to make the public more intelligent as to the great importance of the phase of governmental effort dealing with the improvement of crops.

F. E. Lloyd.

NEWS ITEMS

Mr. Percy Wilson and Mr. William T. Horne sailed from New New, June 25, to take up their work as assistant botanist and assistant pathologist, respectively, at the Estación Agronómica, Santiago de las Vegas, Cuba.

Professor H. H. Rusby is at Kew, engaged in the critical comparison of South American material from the herbarium of the New York Botanical Garden with that preserved in the herbarium of the Royal Gardens.

Professor Duncan Starr Johnson, of Johns Hopkins University, and Miss Mary Estella Gottert Lentz, of Baltimore, were married June 22, 1904. After spending the month of July at the biological laboratory at Cold Spring Harbor, Professor and Mrs. Johnson intend to sail for Europe early in August.

The most noteworthy botanical event in New York during June was the visit of Professor Hugo de Vries, of Amsterdam, Holland. He arrived June 7, received the degree of Doctor of Science from Columbia University on the following day; delivered the address at the opening exercises of the Station for Experimental Evolution, at Cold Spring Harbor, June 11; on June 14 started for Philadelphia; and thence proceeded to the Desert Laboratory at Tucson, Arizona, in the company of Professor F. E. Lloyd. He remains in this country until the first of October.

The Hulst Botanical Club of Brooklyn, N. Y., was organized on April 13, 1904. The club was named in memory of Dr. George D. Hulst, who for many years was president of the Department of Botany of the Brooklyn Institute of Arts and Sciences. Dr. Hulst was probably the best informed botanist of the flora of Long Island. The object of the club is the mutual benefit to its members and the increase of interest in botanical subjects. The special work the club has undertaken is the making of an exhaustive list of the flora of Long Island. Dr. A. J. Grout was appointed director of the club. Mrs. Carolyn W. Harris, secretary. At the first meeting of the Hulst Botanical Club the

members formed a chapter of the Wild Flower Preservation Society of America.

Botanical visitors in New York City since the middle of February include Dr. Hugo de Vries, Professor of Botany and Director of the Botanical Garden of the University, Amsterdam, Holland; Professor Dr. L. Wittmack, of the University of Berlin, editor of *Gartenflora*; Mr. Frederick V. Coville, Mr. and Mrs. C. V. Piper, Mr. William R. Maxon, Dr. J. N. Rose, and Mr. W. F. Wight, of Washington, D. C.; Mr. John F. Cowell, Director of the Botanic Garden, Buffalo, N. Y.; Dr. C. F. Millspaugh, of the Field Columbian Museum, Chicago; Mr. George H. Shull, lately of the University of Chicago, now in charge of the botanical work at the Station for Experimental Evolution, Cold Spring Harbor, N. Y.; Professor and Mrs. T. D. A. Cockerell, of Colorado Springs, Colo.; Dr. John W. Harshberger and Dr. Charles H. Shaw, of the University of Pennsylvania; Professor E. Mead Wilcox, of the Alabama Polytechnic Institute, Auburn, Alabama; and Professor W. C. Coker, of the University of North Carolina, Chapel Hill, N. C.

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NOTES ON THE VARIABILITY OF HYPOTHELE REPANDA

By Howard J. Banker

The species under discussion, *Hypothele repanda* (L.) Paulet, has been more generally known as *Hydnum repandum* L. The plant is easily recognized, being a fleshy mushroom- or toadstool-like plant, but with the underside of the cap formed into fine teeth or prickles instead of with plate-like gills as is the usual case in mushrooms. The color varies from nearly white through cream and buff to reddish buff. The flesh is white and brittle. The taste is mealy, at first mild, but soon producing a tingling sensation in the back of the throat. The spores are white, subglobose to ovoid, usually apiculate, smooth, and with from one to several small, highly refractive spots, or guttulae; these often appear like small warts, but are evidently inside instead of outside of the spore-membrane, though often associated with small protuberances or with pits in the spore-wall. The plant grows on the ground in mixed woods, usually where it is damp. It is fairly common and is widely distributed both in Europe and America. Besides its cosmopolitan character, it appears to be a species of large range of variability. In fact, so great a degree of variation does it exhibit that several attempts have been made to split it into distinct species, but as yet without very great success.

The first of these attempts was made in 1774 by Jacob C. Schaeffer in his *Icones Fungorum*, in which he divided the original species into two based on color, namely, *Hydnum rufescens* (*op.*

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cit. 4: 95. *pl. 141*) and *H. flavidum* (*op. cit.* 4: 99. *pl. 318*). This distinction did not meet with the approval of the European mycologists and was soon forgotten. It could not be expected that a specific distinction could be maintained simply on a shade of color. Nevertheless, with more refined means of discrimination it is possible that Schaeffer's species may yet be established on more solid foundations. In 1799 Persoon * attempted to separate a species which he unfortunately called *rufescens*, a name, as we have seen, preoccupied by Schaeffer. This species was established on better characters than that of Schaeffer and has persistently perplexed systematists with its claims to recognition. It has repeatedly been treated as a species or as a variety, or has been reduced to synonymy, by different European botanists, and even the same author has frequently shown his perplexity in the varying treatment he has given it in different editions of his works. It is to be noted, however, that European authors agree in ascribing to *H. rufescens* Pers. not only a darker, more reddish color, but a thinner habit and smaller size than to the typical *H. repandum* L. In this respect the European plants stand somewhat in contrast with the American forms, for with us the larger, more stockily built plant is dark reddish buff, while the smaller, thinner plant is pale buff. There is with us a still smaller plant not exceeding 4 cm. in width of pileus which is reddish buff in color, but it is doubtful if this is the same as the European plant referred to *H. rufescens* Pers. While there is thus some difficulty in fully identifying the American plants with their European congeners we find that they are involved in the same perplexing variability that seems to baffle all attempts to distinguish distinct species.

The following synopsis may assist in some degree in separating the principal forms peculiar to this country and is offered as an aid to a better knowledge of this difficult segregation.

Plant reddish buff.

Plant small, less than 4 cm. wide, often umbilicate; spores large, 8–10 μ wide. Form *a*.

Plant large, stout, reaching 12 cm. wide, average width of cap 6–8 cm.; pileus often cracked, sometimes into thick scales, deeply umbilicate; spores 7–8 μ wide. Form β.

* Obs. Myc. 2: 95.

Plant pale buff to cream-color, slender, medium size, average 4–6 cm. wide, rarely 7 cm.; spores 7–8 μ wide. Form γ.*

In all these forms none of the characters ascribed appear to be constant and intermediate forms are easily found, yet in a general way the three forms are readily distinguished in the field by one familiar with the habit of the plant; but herbarium specimens undergo so great changes in drying that it is very difficult to separate these forms with any degree of satisfaction.

Form α is the plant described as *Hydnum umbilicatum* by C. H. Peck, Bull. N. Y. State Mus. **10**: 953. *pl. K. f. 14–18.* Peck especially emphasizes the umbilicate feature of the pileus, but aside from this character the plant does not appear to be essentially different from those forms which he has usually referred to *rufescens*. On this point compare Peck, Rep. N. Y. State Mus. **48**: *pl. 38. f. 7–10.* It is to be observed that in the plate cited, which shows both *repandum* and *rufescens*, the latter is represented with larger spores than the former and that actual measurement of the plate on the scale of 1 : 400 gives as values for the spores in the case of *repandum* 7–8 μ and for the variety *rufescens* 8.5–10 μ. Peck gives for his species *umbilicatum*, *loc. cit.*, spore-values equivalent to 7.5–10 μ, and in the accompanying plate they are represented of corresponding size. As the umbilicus hardly seems a sufficient ground upon which to establish a species I should regard all the forms in the plates cited as belonging to one segregation, which must be known as the species or variety *umbilicata*; for even if its hould be identified with *H. rufescens* Pers. the latter name, as we have seen, is preoccupied by *H. rufescens* Schaef. which appears to be a distinctly different thing. Specimens referable to this form have been observed in the following collections: Massachusetts, *Forster*; New Jersey, *Ellis*; Carolina or Pennsylvania, *Schweinitz.*† It is very probable that this segregation should be regarded as a distinct species.

* It has not seemed best to the writer to treat these as varieties, much less as species, in the present paper. The above device has therefore been resorted to, until their claims to distinction can be more clearly established.

† The specimen observed in the Schweinitz herbarium in the Acad. Sci. Phila. was marked "*Hydnum rufescens* — Schaeffer, Carolina, Pa." The specimen answered remarkably to Peck's description and plate of *H. umbilicatum.*

The three forms considered above do not by any means exhaust the possibilities of variation in this species. A form has been found in Connecticut by Underwood in which the teeth in the dried specimen were subtranslucent, yellowish rufescent, compressed at base, narrowing abruptly into a terete upper portion with ciliate lighter tips. This remarkable plant would be considered as sufficiently marked to form the basis of a new species but for the fact that only one specimen has been seen and that studied only in the dry state.

Hypothele repanda is sometimes reported as having teeth somewhat flattened or even fimbriate. This is not the usual character and may indicate a tendency under certain conditions to vary in a definite direction. Sowerby, Eng. Fung. *pl. 176*, figures a plant of this type. Earle reports a plant marked by this feature as found in a sphagnum swamp, Auburn, Alabama, the teeth being 1 mm. wide and 2–4 mm. long in the dried specimen. In his field-notes on this specimen Prof. Earle says, "Reaching 6 cm., the largest specimen I have seen of this flesh-colored *Hydnum*," which would indicate that the southern forms of *H. repanda* are small. Several years ago the writer found a small specimen of this type and not having then seen *H. repanda* the plant was referred to *Sistotrema*. It seems very probable that such a mistake has occurred in the case of other collectors. In fact, the question may reasonably be raised if the genus *Sistotrema* has not itself been established on some such variable type. In 1902 the writer found, at Schaghticoke, N. Y., a group of these plants showing a remarkable development of the flattened teeth. On a wooded hillside of sand loam and in comparatively wet ground was a bunch of three plants. The first was 7.5 cm. high; pileus 7.5 cm. wide, irregular, subinfundibuliform, the surface cracked and broken up more or less into thick scales, buff-colored; stem 5 cm. long, 7 mm. thick, somewhat bulbous at base, cream-colored; teeth close-set, flattened, often 2–4 mm. wide, a few normal terete teeth scattered among them, the upper edge of the flat teeth sometimes cut-toothed. The flattening of the teeth did not appear to be in any definite direction. The other two plants were similar but smaller and had relatively more normal

teeth. Ten feet farther up the hill and where the ground was less wet was another cluster of plants resembling the latter in size and general features but with only a few flattened teeth, one having not more than a dozen, while near the top of the slope and on drier ground were a number of plants showing no flattened teeth whatever. The conclusion would appear to be that growth in wet ground tends to develop flattened teeth. Aside from the flattened character of the teeth these plants would be referred to form β, which I have never observed growing in very wet places. Form γ, however, has been observed always in wet springy places and shows no tendency to the flattening of the teeth.

The various forms of *H. repanda* have been thus fully discussed in order to point out the great variability of this species and to emphasize the need as well as the opportunity for thorough field-work on the forms, habitat, and distribution of this common yet little understood plant.

De Pauw University,
Greencastle, Indiana.

THE BOTANICAL MEETING AT McCALL'S FERRY, PENNSYLVANIA

By George V. Nash

As announced in the June number of this journal, the joint meeting of the Torrey Botanical Club and the Philadelphia Botanical Club took place at McCall's Ferry, the week of July 2–9. The meeting proved to be a most enjoyable affair, and much of this enjoyment was the result of the care and endeavor on the part of the members of the Philadelphia club, several of whom acted as guides and led us to the haunts of rare and interesting plants. Certainly the event was a memorable one. Friends and members of other botanical societies accepted the joint invitation of the two clubs, and added much to the pleasure of the meeting by their presence.

Headquarters were established at the hotel on the York county

side of the river, a hostelry most pleasant, where comfort was dispensed by the agreeable host, and where food was good and in plenty, both prime requisites to a horde of hungry botanists, whose appetites were none of the lightest after an all-day tramp, with perhaps little if any refreshment for the midday meal.

The little village of McCall's Ferry is located about twenty-five miles north of Havre-de-Grace, on the west bank of the Susquehanna, that river of rocks, shallow waters and varying width. Below this point the stream is very wide ; for instance, at Peach Bottom, a few miles below, it is about one and a half miles from shore to shore, while but a short distance above the hotel it is very narrow, and, as a member of the party expressed it, the river appeared to have turned over on its edge, for at this point it is extremely deep. Hills are on every side, and deep and shaded ravines with purling mountain brooks are frequently met with. The mountain-sides and ravines are often adorned with large masses of *Rhododendron maximum*, and as this was in full bloom during our visit the effect was most charming.

The river is filled with islands, some of these but small rocks, while others are of considerable size, a mile or so in extent. This rocky feature seems to be characteristic of this river, for at Harrisburg, where the writer spent many years, and at Rockville and Dauphin, just to the north of it, the river presents the same appearance. Many of these islands, high and dry at the time of our visit, which was at low water, are aflood early in the season, some of the smaller ones buried under many feet of water, and places where we walked dry-shod would be a howling chaos of rushing waters. The writer has often seen this same river in these moods, and at such times it is not to be trifled with. It is on these islands that many plants of unusual interest to that region are to be found. One of these, probably brought down by the river from its more northern reaches, is *Veronica scutellata* L., hitherto, I believe, found no further south than New York state. Its occurrence so far south was quite a surprise, but its tenure may be but a short one, for the next high flood may reach it and wash it away, and another botanical locality will live only in history or in the few specimens preserved.

This must be the fate of many such plants, and the character of the island flora must therefore be constantly changing.

McCall's Ferry is not the place it once was in the prosperous days of the canal, when the swish of the tow-line and the expressive if not elegant language of the driver broke in upon the stillness around. The canal is but a ditch, fast filling up, and locks and banks are rapidly crumbling away. Nature does not tarry long in razing the works of man, for it is but ten years since the canal was in active operation. But its delightful surroundings; these remain, the homes of rare and interesting plants. Many of these were seen for the first time by some members of the party growing in their native haunts. Among them were several ferns, including *Asplenium Bradleyi* and *A. montanum*. It is quite a delight to see in their living freshness plants which one has known by name only or from herbarium specimens.

Many excursions were made to surrounding points, including visits to York Furnace and Tucquan Creek. It is to be hoped that these "symposia" may be held every year, and that they may all be as successful and a source of as much pleasure and delight as has this one. An opportunity was afforded this year for the active botanists of this eastern country to get together and compare notes, and it can but broaden the views of all and add much to the accumulating knowledge of the botany of the eastern states.

THE NOMENCLATURE OF HEXALECTRIS AND APLECTRUM

By John Hendley Barnhart

The genus *Hexalectris* was proposed by Rafinesque in 1825, and republished by him in later years. It was monotypic, being based upon "*Bletia aphylla* Nutt. or *Arethusa spicata* Walt." As these two names have been identified by recent writers with plants belonging to two distinct genera, it has proved of no little interest to me to trace their history.

Walter's original description of *Arethusa spicata* is as follows:

"radice tuberosa, caule sesquipedali succulento aphyllo, floribus bracteatis sessilibus alternis spicatim positis, petalis aequalibus ovatis conniventibus flavescentibus striis purpureis, nectario longitudine petalorum rugosa subtrilobo, lobis lateralibus brevioribus erectis, colore petalorum, lobo medio purpureo propendente, capsula columnari angulare." While the expression "radice tuberosa" is not very happily chosen, the remainder of the description leaves no room for doubt that the plant intended was the same as that described by Nuttall thirty years later under the name *Bletia aphylla*.

This species was very little known for many years after the publication of Walter's name for it. Meanwhile Muhlenberg had transmitted to Willdenow, under the name *Cymbidium hyemale*, another orchid from the eastern United States, and Willdenow had published it. Pursh, not knowing Walter's plant, referred it to *Cymbidium hyemale;* in this way the two became confused in synonymy, and have so continued. In 1888, in accordance with the prevailing misconception, Walter's specific name was restored as the oldest one for the plant since known as *Aplectrum spicatum* (Walt.) B.S.P.

Since Pursh's time, however, at least one botanist, Elliott, has clearly distinguished the synonymy of the two species involved in this discussion. He unequivocally referred *Arethusa spicata* Walt. to *Bletia aphylla* Nutt., and further informs us (Sk. 2: 502) in a note that "this plant has always been considered by our southern botanists as the *A. spicata* of Walter." Elliott also describes *Corallorhiza hyemalis* Nutt. (*Cymbidium hyemale* Muhl.), without any intimation that *Arethusa spicata* Walt. has anything to do with it.

The genus *Aplectrum*, and the binomial *Aplectrum hyemale*, are commonly credited to Nuttall's *Genera*, but this is a mistake. Nuttall there proposed the name *Aplectrum*, it is true, but as a subgenus only, and its only species, "*hiemalis*," is clearly named as his third species of *Corallorhiza*. Five years later, in discussing the genus *Corallorhiza*, Nuttall * again used the name *C. hiemalis*,

* Nuttall, T. Remarks on the species *Corallorhiza*, indigenous to the United States. Jour. Acad. Nat. Sci. Phila. 3: 135–139. O 1823.

putting the species again into the *subgenus Aplectrum*. Apparently the first use of *Aplectrum* as a generic name was by Torrey in 1826, although two years earlier Rafinesque had used it in the slightly altered form *Aplectra* — neither Torrey nor Rafinesque making any reference to Nuttall. The binomial "*Aplectrum hiemale* Nutt." had, indeed, been cited as a synonym by Eaton in 1822 (Man. ed. 3. 250), but it does not seem to have been adopted formally in any publication until 1826.

The synonymy of the two genera, as cleared up by the foregoing discussion, is as follows:

HEXALECTRIS Raf. Neog. 4. 1825.

Hexalectris spicata (Walt.).

Arethusa spicata Walt. Fl. Carol. 222. 1788.

Bletia aphylla Nutt. Gen. **2**: 194. 1818.

Hexalectris squamosa Raf. Fl. Tell. **4**: 48. 1836.

Hexalectris aphyllus Raf.; Gray, Man. ed. 6, 501. 1890.

HEXALECTRIS MEXICANA Greenm. Proc. Am. Acad. **39**: 77. 1903.

APLECTRUM (Nutt.) Torr. Compend. 316, 322. 1826.

CORALLORHIZA subg. APLECTRUM Nutt. Gen. **2**: 197. 1818.

APLECTRUM HYEMALE (Muhl.) Torr. Compend. 322. 1826.

Cymbidium hyemale Muhl. in Willd. Sp. Pl. **4**: 107. 1805.

Corallorhiza hiemalis Nutt. Gen. **2**: 198. 1818.

Aplectra elatior Raf. Cat. Bot. Gard. Transylv. 13. 1824.

Aplectrum spicatum B.S.P. Prel. Cat. N. Y. 51. 1888; not *Arethusa spicata* Walt.

Aplectrum hyemale pallidum (House).

Aplectrum spicatum pallidum House, Torreya, **3**: 54. 1903.

APLECTRUM SHORTII Rydb. in Britton, Man. 305. 1901.

SHORTER NOTES

The Validity of the Genus Paratheria Griseb.—In working over some material recently collected by Mr. A. H. Curtiss on the Isle of Pines, just to the south of Cuba, a peculiar grass was encountered which proved somewhat of a puzzle for a time. Investigation showed that it is *Paratheria prostrata* Griseb. (Cat. Pl. Cub. 236. 1866), a grass, which, so far as material at hand indicates, has been collected in Cuba but once — by Wright in the year 1865, the type of the genus. It must therefore be rare in herbaria, and its rediscovery by Mr. Curtiss is consequently of interest and value. The genus *Paratheria* is referred by Hackel to *Chamaeraphis*, and it appears also to have been considered in this light by Col. Munro, for Sauvalle (Fl. Cub. 200) has published a *Chamaeraphis parvigluma* Munro, a nomen subnudum, however; this is based upon Wright's no. 3909. I cannot find this number in our collections, but I do find a 3906 labeled as above, and I suspect therefore that the 3909 is a typographical error for 3906.

I cannot agree with the disposition of this genus made by both Hackel and Munro, and must consider it as distinct from *Chamaeraphis*, for reasons which will be given below. *Chamaeraphis* was based on an Australian grass which the author named *C. hordeacea*. At first sight, the superficial resemblance of the two genera is quite marked, but a study of the spikelets discloses differences which make it desirable to keep them apart. In *Chamaeraphis* the first two scales of the spikelet are empty, the first one very small, the second as long as the spikelet; the third scale encloses a staminate flower; the fourth scale, which is only about one half as long as the spikelet, contains a pistillate flower, but no stamens, so far as our material indicates; this is also in conformity with the original description of brown, the author of *Chamaeraphis*. In *Paratheria*, the first three scales are empty, the first and second very small, almost rudimentary, the third as long as the spikelet; while the fourth encloses a perfect flower. These differences in scale and floral structure, reinforced by the

wide divergence in geographic distribution, indicate rather clearly the necessity for keeping them separate.

George V. Nash.

New York Botanical Garden.

Sarracenia flava in Virginia. — Early on the morning of June 17, 1904, while coming up through Virginia on the Seaboard Air Line, I saw from the train, in Dinwiddie County, seven miles below Petersburg, a colony (containing probably several hundred individuals) of *Sarracenia flava*. As I was traveling at the rate of about a mile a minute, I did not have time to examine its habitat very closely, but the plants seemed to be growing in a sort of meadow, just as I have seen them in North Carolina, about forty miles farther south. (See Torreya, 3: 123, 124. August, 1903.) This locality is probably a few miles west of the fall-line, though this fact does not preclude the possibility of its being on some comparatively recent formation.

This seems to be the northernmost known station for *Sarracenia flava* (latitude 37° 8′). Although the species is credited to Virginia in most manuals of the Northern States (probably on the authority of Clayton and other pre-Linnaean botanists), I have seen no specimens from that state, and none are cited in Gray's Synoptical Flora or in Kearney's Dismal Swamp report. I have, however, just found a record of one other Virginia station for it. Prof. Lester F. Ward (Bot. Gaz. **11**: 37, 38. February, 1886), mentions seeing specimens collected in the summer of 1885 by W J McGee in "a swamp in a pine wood, two miles north of Rowanty Creek" (presumably near the fall-line). From examination of a map it seems that my station must be a few miles northwest of his, near the head of the same creek.

That portion of the railroad on which I was traveling at the time above mentioned has been in operation only four or five years, and the country adjacent to it is probably little known to botanists, though I know of several who have already passed through it on trains.

Roland M. Harper.

College Point, N. Y.

An Undescribed Species of Alnus. — Some years ago I collected fruiting specimens of a large alder in swampy woods, along the edge of a brook on the coastal plain of Staten Island, near Grant City; these were at the time referred to *Alnus incana*, though with doubt, inasmuch as the height of the tree seemed much too great for that species, and the large, strongly-pointed leaves seemed also to be different from those of any specimens of *incana* that I had seen. The woods in which this tree grew were cut away soon after my collection was made, and, though a search was made in the vicinity for other plants, I was never able to find another specimen. I have been confident for a long time that it represented a species distinct from both the European *Alnus incana* and its American representative, *Alnus glauca* Michx., which I think very likely to be distinct from *incana*. Mr. Bicknell has found this summer shrubs with foliage evidently the same as my tree from Grant City, in similar situations in southeastern Long Island, so I now feel warranted in proposing this apparently local plant as an undescribed species.

Alnus Noveboracensis sp. nov.

A shrub or small tree, sometimes 8 m. tall, with a trunk 1 dm. thick. Young twigs and petioles densely pubescent; leaves oblong to obovate, acute at both ends, 12 cm. long or less, sharply irregularly serrate, very densely pubescent on the prominent veins beneath, otherwise glabrous or nearly so, dark green above, paler green but not at all glaucous on the under side; ripe pistillate aments numerous, oblong, 1.5 cm. long, very short-stalked; nut oval, about one half longer than wide, narrowly margined.

Woods and thickets near the coast, southeastern New York. Type from Grant City, Staten Island.

N. L. Britton.

PROCEEDINGS OF THE CLUB

Tuesday, May 10, 1904.

This meeting was held in the library of the New York College of Pharmacy and 15 persons were present, Rev. L. H. Lighthipe presiding.

Resignations from the Club were read and accepted from Mr. Maturin L. Delafield, Jr., Mr. W. C. Alpers and Mr. E. S. Miller. Mr. Miller was elected to corresponding membership.

The resignation of Prof. F. S. Earle as recording secretary was read and accepted. The vacancy was filled by the election of Mr. E. W. Berry.

The first paper on the scientific program was by Dr. H. M. Richards, entitled "Notes on the Peat Bogs of Ireland." The peat bogs have been variously estimated as covering from one fifth to one tenth of the surface of Ireland; probably the larger estimate is excessive.

Dr. Richards' observations at several points on the west coast including Donegal and Achill Island were given. The basis of the bogs is not always the same, but in some cases it is glacial gravel. The thickness of the peat varies from 1 or 2 ft. to 40 ft., but no exposures of more than 25 ft. thickness were seen. On the slopes and hillsides the peat is thinner but becomes accumulated in the lower situations so that the thickness of the bog does not necessarily show its age. Bogs have been known to burst, as in Sligo in 1831, and to do considerable damage to houses below them.

The peat is mostly vegetable matter and yields very little ash. According to Lyell its formation is supposed to be due to the low temperature preventing complete decomposition of the vegetable matter. Peat is not formed in warm countries and the additions to the beds are made in cold weather. In the bogs seen there was standing water only in the holes and ditches but the soil was wet and soggy. Comparatively little of the bog oak is found. Some of the stumps are in place, showing that they are not driftwood carried into the bog. The dark color and hardness of the bog oak is said to be due to the action of a diatom, a *Melosira*, and the formation of bog iron ore is supposed to be due to the same diatom.

It was suggested that part of this action may be due as well to *Crenothrix*. There is little of vegetable remains except at the top of the bog. *Sphagnum* makes up a comparatively small part of the peat bog vegetation as seen in the localities men-

tioned, and sphagnum peat is not so highly prized for fuel. A small *Carex* seemed to be the principal peat-forming plant. Two species of *Drosera* grow in profusion and the heather and ling thrive very well and contribute considerably to the peat. *Pteridium* and several small ferns are rather common. *Sphagnum* and many fresh water algae grow in the holes and ditches, and from such places West has made fine collections of algae, especially desmids. Peat bog soil has been found to be very sterile and at least two years are required to reclaim it, the method including throwing it up and exposing to the air, and the application of fertilizers and lime. The cause of this sterility is not clearly understood, and is perhaps due to the lack of some of the necessary mineral salts and to the fact that the nitrogenous materials may not be in the best available form for plant nutrition. Some of the reclaimed peat bogs are very fertile lands but if neglected they quickly run back to their sterile condition. If cultivation ceases the *Pteridium*, heather and carices come back in a few years.

Discussion developed the fact that recent studies suggest that the European *Drosera rotundifolia* is distinct from the American species so called.

The second paper of the evening was by Dr. Marshall A. Howe, under title of "Remarks on some West Indian Marine Algae." The remarks were based chiefly upon specimens collected by the speaker in March and April of the present year on the Florida Keys and the Bahama Islands, supplemented by specimens from Bermuda and Porto Rico and also by some obtained on a previous visit to Key West. The discussion was confined to the families Caulerpaceae and Codiaceae, members of the order Siphonales and class Chlorophyceae. The family Caulerpaceae, according to the more recent writers, consists of the single genus *Caulerpa*, with probably sixty or more well-defined species, including plants of a great diversity of form and habit. Some of the earlier phycologists, impressed by these evident differences, suggested generic segregations, and it is probable that some of the proposed genera are as well limited as are many of the current genera among the Agaricaceae. There

is, however, not such an unwieldy number of species to afford an excuse for generic splitting, as is the case with the agarics, and there is practically nothing but habit and external form to lay hold of in limiting species and attempting generic segregations. Specimens were shown illustrating the principal sectional or subgeneric groups.

The Codiaceae were illustrated by specimens of *Codium*, *Avrainvillea*, *Penicillus*, *Rhipocephalus*, *Udotea* and *Halimeda*. The genera *Penicillus* and *Rhipocephalus* are especially well represented in the Bahama Islands. Four species of *Penicillus* and two of *Rhipocephalus* were shown, all of which were found growing within a mile radius in Bemini Harbor, Bahamas. One of these is supposed to be the species described from the Bahamas by Decaisne in 1842 as *Penicillus oblongus* and apparently not met with in the meantime. This species was transferred to the genus *Rhipocephalus* by Kuetzing. In reality, it stands between the genera *Penicillus* and *Rhipocephalus* and weakens the distinction between them. It is easily a *Rhipocephalus* when it is young, but as it gets older becomes more like a *Penicillus* and might then be casually passed by as a form of the common *Penicillus capitatus*. The head, however, is usually more oblong than in that species, the branching of the threads of the brush is characteristic, and the arrangement of the threads in the apical or younger part of the brush is always distinctive.

Among the species and forms of *Halimeda* exhibited was one from the Florida Keys which is soon to be described as a new species. This has been confused with *Halimeda Tuna* by both American and foreign students of the genus, but is readily distinguished from that and other described species, by the fact that the surface of each cortical tube or "cell" is drawn out into a strong spine.

WILLIAM T. HORNE,
Secretary pro tem.

NEWS ITEMS

Mr. George R. Lyman, of the department of botany of Dartmouth College, has been advanced to the rank of Assistant Professor.

Mr. Alfred Akerman, of the Yale Forest School, has been appointed to the newly created office of state forester of Massachusetts, the appointment dating from August 1.

Part II of Dr. A. J. Grout's "Mosses with Hand-lens and Microscope" was issued late in May. This completes the Dicranaceae, includes the Grimmiaceae and Ephemeraceae, and begins the Tortulaceae.

Professor Volney M. Spalding has arranged to continue, during the coming winter, at the Desert Botanical Laboratory of the Carnegie Institution, the special line of research which he began there last year.

We learn from *Science* that Dr. Joseph T. Rothrock has been compelled by ill health to resign the position of forestry commissioner of the state of Pennsylvania, and the vacancy has been filled by the apppointment of Mr. Robert S. Conklin.

Mr. Howard J. Banker, for several years past instructor in the Southwestern State Normal School of Pennsylvania, is spending the summer in study at the New York Botanical Garden. In September he takes up his new duties as professor of biology in DePauw University.

Announcement was made in the daily press, during the last week in July, of the death of Dr. Rodolfo Amando Philippi, at the age of 95 years. Born and educated in Germany, he settled in Chile in 1851, and made that country his permanent home. For many years he was director of the Museo Nacional, at Santiago de Chile (a position now held by his son); and by his death South America loses one of her most famous botanists.

Mr. Roland M. Harper returned in June from Georgia, where he had been engaged in field-work for about seven months. The first four months were occupied in the collection of tree-specimens for the Georgia State exhibit at St. Louis; the remainder of the time, in continuation of his phytogeographical exploration of the coastal plain. An opportunity was thus afforded for a study of the spring flora of this region, which has been but little known.

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THREE NEW VIOLETS FROM LONG ISLAND

By Eugene P. Bicknell

It would not be ventured at this time to propose any additions to the number of our eastern violets, already troublesome with new and poorly understood species, were not the plants here to be noticed so signally marked that they can scarcely fail of easy recognition, whether encountered in the field or on the herbarium sheet.

It is suggestive in many ways to find in our local flora three such strongly individualized plants, and of one genus, not to mention others awaiting further study, which have continued to remain unknown, but there is many another like case to remind us how imperfectly, even yet, our common flora is understood.

Viola pectinata sp. nov.

Scarcely or not at all tufted, the plants growing singly or few together from short, erect rootstocks, glabrous, except some very minute hispidulous pubescence on the leaves mostly on the margins and veins: leaves not numerous; petioles slender, elongated, 10–30 cm. long, often purplish; leaf-blades thickish, firm, deep rather bright green, even somewhat shining above, deltoid-ovate to widely deltoid, often wider than long, acuminate or sometimes obtuse, the truncate base often decurrent on the petiole, the sides often concave in outline, closely cut-pectinate below the middle with linear, acute, entire lobes or sometimes sharply dentate; mature blades 6–10 cm. wide, 4–6 cm. long; early leaves much smaller, occasionally narrower and sub-sagittate, finely pectinate or dentate: peduncles shorter than the leaves or sometimes as long: flowers medium-sized, deep purple-blue or paler, the petals whitened and dark-lineate toward the

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base within, especially the pilose-bearded lateral and lower ones, entire or undulate-dentate or emarginate, all often with scattered pilose hairs over their inner surfaces ; sepals narrowly lanceolate, tapering-acute, not ciliolate, posterior auricles well developed : capsule oval or oblong, obtuse or rounded at apex, 6–10 mm. long ; seeds ovoid, small, less than 1.5 mm. long ; cleistogamous flowers on erect peduncles shorter than the leaves, acuminate, small, the sepals 5–7 mm. long.

Southwestern Long Island, in low grounds near or at the borders of salt marshes, often with *V. Brittoniana*. Collected in two localities at Woodmere, and at East Rockaway. Type from Woodmere ; in Herbarium New York Botanical Garden.

A noteworthy violet which introduces a strikingly new leaf-pattern among our eastern species. The nearest approach to its configuration of leaf is seen in certain forms of *V. emarginata*, with which species, however, *V. pectinata* need not be confused. Its systematic position appears to lie somewhere between *V. emarginata* and *V. Brittoniana*, perhaps nearer to the latter as indicated by the character of its pubescence and its flowers, as well as by general habit, notwithstanding the marked difference in form of leaf.

Viola lavandulacea sp. nov.

Tufted from short compound rootstocks, rather pale green, glabrous or with traces of minute pubescence on the upper surface of the leaves : petioles slender, much elongated, becoming 15–23 cm. long ; leaf-blades oval or ovate and obtuse to deltoid-ovate and acute, abruptly contracted or truncate at the base, often slightly decurrent and a little undulate along the lower margins, obscurely crenate or subentire to crenulate-denticulate, mostly 2–5.5 cm. long, 2–4 cm. wide, or finally as large as 7 × 5 cm. : peduncles 10–30 cm. high, finally much surpassing the leaves : flowers pale lilac to lavender blue, the petals whitened and much narrowed basally, all or all but the two upper ones sharply dark-lineate, the lateral pair bearded with a scant tuft of short gland-tipped hairs, the others glabrous, the lower one notably shorter than the others ; sepals glabrous, lanceolate or linear-lanceolate, often sub-falcate, obtusely purplish apiculate ; cleistogamous flowers on elongated erect pedicels, linear-lanceolate, the narrow sepals obtuse, the auricles rather small ; mature capsule not seen.

Southwestern Long Island, in damp meadows. Collected at Rosedale, and at Woodmere. Type from Woodmere; in Herbarium New York Botanical Garden.

Related to *Viola cucullata* and growing with it, but well set apart from any of the *cucullata* group by its ovate or deltoid strictly non-cordate leaves. By comparison with *V. cucullata* in the field the flowers are seen to be markedly different in color as well as in other characters.

Viola notabilis sp. nov.

Forming large tufts from stout rootstocks: leaves deep green, appearing glabrous but with some minute pubescence, mostly marginal and along the veins; petioles rather stout, becoming 15–35 cm. long; blades ovate to broadly ovate, openly cordate to nearly truncate at base, obtuse or rounded at the apex, bearing below the middle several oblong, obtuse or acutish lobes often extending less than halfway to the midrib but sometimes more deeply cut; the basal lobes often dilated and dentate or lobed along the upper margin: peduncles glabrous, usually much surpassing the leaves, becoming 20–43 cm. high: flowers deep purple-blue, very large, sometimes spreading 3–4 cm. with the petals 10–15 mm. broad, all the petals bearded with glandular hairs or the upper pair glabrous; sepals lanceolate or linear-lanceolate, mostly apiculate-obtuse, distinctly ciliate; cleistogamous flowers narrowly lanceolate-acuminate, on erect peduncles sometimes 30 cm. long, their sepals long-auriculate: capsules oblong, 10–12 mm. long, rather obtuse, little surpassing the sepals.

Southern Long Island. Type from Woodmere; in Herbarium New York Botanical Garden.

A conspicuous and handsome violet of low grounds often in wet meadows or near the borders of damp thickets. It is often found growing with or near *Viola Brittoniana*, to which it is nearly related but is much larger in every way, of more tufted habit, the leaves much less divided, with broader, shorter, more obtuse lobes, the flowers deeper in color with broader petals, the sepals usually distinctly ciliolate. *Viola Mulfordae* is at once distinguished from *V. notabilis* by its pubescence and more oblong leaves as well as by its smaller general size and smaller flowers on relatively shorter peduncles.

Late in the season the leaves of *V. notabilis* become more deeply cleft and much enlarged and dilated, attaining a length of 6–9 cm. and sometimes becoming 10–11 cm. broad.

THE DATE OF PURSH'S FLORA

By John Hendley Barnhart

A short time ago Mr. Roland M. Harper called my attention to an inconsistency which has crept into several recent publications, inasmuch as they recognize the priority of plate *1599* of Curtis's Botanical Magazine (*Helonias graminea* Ker) over Pursh's Flora (*Veratrum angustifolium* Pursh),* while they take it for granted that Pursh's work (*Conostylis Americana* Pursh) is older than plate *1596* of the Botanical Magazine (*Lophiola aurea* Ker).

At that time the Botanical Magazine was issued regularly on the first of each month, each number consisting of seven or eight plates with their accompanying text, and each plate bearing the date of issue; so it is a simple matter to determine that plates *1596* and *1599* were issued together on the first of November, 1813. Both volumes of the original edition of the Flora Americae Septentrionalis of Pursh bear the date 1814 on their title-pages; and at first sight it would appear quite evident that Ker's two names have priority over any proposed in Pursh's work.

The situation is complicated, however, by the fact that Ker, under *Lophiola aurea* (*pl. 1596*), mentions *Conostylis Americana* as a synonym, and cites the Flora of Pursh by volume and page, without anything to suggest that that work might not be in the hands of the botanical public. From this it is evident, either that Pursh's work was published prior to the date given on its title-pages; or that it appeared in parts, the title-page dates marking the completion of its publication; or that Ker had access to the printed but unpublished sheets.

The first of these alternatives is wholly improbable. Post-dated publications are rare, and the reason is obvious; the fraud

* *Stenanthium gramineum* (Ker) Morong; *Stenanthium angustifolium* (Pursh) Kunth.

is of a kind which benefits no one, and is sure to be detected. If a book should appear on the market now, bearing on its title-page the date 1905, anyone into whose hands it might come during the next few months could detect the error. Similarly, if Pursh's Flora, dated 1814, was offered to botanists in its entirety before the end of the year 1813, the fact would surely have caused comment at the time. On the contrary, various contemporary botanists refer to Pursh's work as published in 1814, with no hint that it appeared earlier.

Turning now to the pages of the Botanical Magazine, we find: that a manuscript name of Pursh, *Iris prismatica*, was published under plate *1504* (N 1812), but with no reference to his Flora; that under plate *1551* (My 1813) the Flora is cited for the first time, but without any page-number; that under various plates (*1566*, *1572*, *1574*, *1579* and *1583*) in the numbers for July, August and September, 1813, the Flora is cited by page, but with the addition of "inedit." or "nondum evulgata," showing that up to the first of September, 1813, at least some portions of the work had not been published; that, beginning with plate *1589* (1 O 1813), the Flora is cited by page, without any reference to its unpublished condition. Under plate *1583* (1 S 1813), however, as early a page as 163 is still cited as "inedit."; and under plate *1592* (1 N 1813) is a reference to "Pursh, whose valuable Flora, speedily to be published, we have been favored with the opportunity of consulting"; under these circumstances, therefore, and in the absence of direct contemporary testimony, there is no reason to suppose that Pursh's work was issued in parts.

If we examine Pursh's Flora, we shall find further interesting evidence bearing upon the case in hand. Under *Iris prismatica*, on page 30, there is no reference to plate *1504* of the Botanical Magazine, and it is not improbable that these early pages of the Flora were in type before the appearance of that plate (N 1812). At the end of the Flora, after the index, is a supplement, containing descriptions of plants that had become known to Pursh while his volumes were going through the press; and following the supplement were seven pages (*744–751*) of "addenda et corrigenda." These were the final pages of the work — the

last to be printed except the title-pages and, perhaps, the preface — and they seem to have been brought down to the very moment when they were sent to press. In them we find references to many of the plates of the Botanical Magazine which had been published during the few preceding months, including two (*1601* and *1602*) which appeared on the first of December, 1813. The preface, too, is dated "December, 1813," and all of the evidence goes to show that the entire work was ready for issue some time before the end of that month. That being the case, and granting that the title-page date 1814 is correct, it is altogether probable that the two volumes of Pursh's Flora Americae Septentrionalis were first offered for sale, together, some time during the month of *January, 1814*. If so the date of issue of the Flora falls between that of plate *1613* (1 Ja 1814) and plate *1614* (1 F 1814) of the Botanical Magazine.

A few remarks may not be out of place here concerning some of the North American plants which were published in the Botanical Magazine while the Flora was passing through the press.

"*Andromeda floribunda* Pursh" dates from the Magazine (*pl. 1566.* 1 Jl 1813) instead of from the Flora (page 293. 1814).

"*Ipomoea Jalapa* (L.) Pursh" first appeared as a synonym in the Magazine (*pl. 1572.* 1 Au 1813). This, however, according to the most recently formulated American code of nomenclature, does not constitute "publication" of the name in a technical sense.

"*Scilla esculenta* Ker" (Bot. Mag. *pl. 1574.* 1 Au 1813) antedates "*Phalangium Quamash* Pursh" (Fl. Am. Sept. 226. 1814). Although Ker himself expressed some doubt as to the identity of these two species, they were long regarded as the same, and it is only in comparatively recent years (Coville, Proc. Biol. Soc. Wash. **11**: 61–65. 1897) that they have been clearly distinguished. Rafinesque, in proposing the genus *Quamasia* (Am. Mo. Mag. **2**: 265. F 1818), based his *Q. esculenta* upon "*Phalangium Quamash* or *Scilla esculenta*," citing both Pursh's and Ker's names for what was supposed to be the same species. The source of Rafinesque's specific name is thus perfectly evident, and it seems to me that the eastern plant should be called

"*Quamasia esculenta* (Ker) Raf.," instead of entering *Q. esculenta* Raf. as a synonym of the western plant, as Coville has done.

"*Ribes resinosum* Pursh" dates from the Botanical Magazine (*pl. 1583.* 1 S 1813) instead of from the Flora (page 163. 1814).

"*Oenothera Missouriensis* Sims" (Bot. Mag. *pl. 1592.* 1 N 1813) has priority over "*Oenothera macrocarpa* Pursh" (Fl. Am. Sept. 734. 1814). The name published by Pursh had been used in 1813 by Nuttall in Fraser's Catalogue, for what was doubtless the same plant, but with a very brief characterization. It is not unlikely, however, that *O. Missouriensis* and *O. macrocarpa*, treated as synonymous by all recent writers, are actually distinct species. In this connection, a brief note published at the end of the text accompanying plate *1674* of the Botanical Magazine should not be overlooked.

"*Lophiola aurea* Ker" (Bot. Mag. *pl. 1596.* 1 N 1813) has priority over "*Conostylis Americana* Pursh" (Fl. Am. Sept. 224. 1814), and the combination "*Lophiola Americana* (Pursh)" is superfluous. Incidentally it may be mentioned that this binomial, *Lophiola Americana*, published as new by Coville (Mem. Torrey Club, 5: 118. 1894) and consequently sometimes credited to him, was proposed by Wood nearly fifty years earlier (Class-book, ed. 2, 540. 1848), and used by him in the various editions of his Class-book during later years.

"*Sabbatia calycosa* Pursh" dates from the Magazine (*pl. 1600.* 1 D 1813) instead of from the Flora (page 138. 1814).

The date of publication of Pursh's Flora falls between that of the 26th volume of Rees' Cyclopaedia and that of the 27th volume of the same work. In the Cyclopaedia, Smith's first reference to Pursh's work is in the second half of volume 27, under the article "*Pinus.*" Speaking of the number of species, he says: "Mr. Pursh has nineteen in his Flora of North America, just come to our hands," and in discussing the different species, Pursh's work is constantly referred to. As this part of the Cyclopaedia appeared early in the year 1814, the whole of the two following volumes being issued before the end of the same year (according to the researches of Mr. B. D. Jackson, see

Jour. Bot. 34: 307–311. 1896), we have here additional evidence that Pursh's Flora was issued at the *very beginning* of the year *1814*. No case has come to my notice in which the question of the respective dates of Rees' Cyclopaedia and Pursh's Flora complicates synonymy.

Tarrytown, New York.

THE FERNS OF NORTHERN CAPE BRETON

By C. B. Robinson

The fern flora of the peninsula of Nova Scotia is of the same general character as that of New England, differing mainly in the absence of about one third of the species found in the latter. Only one additional form appears, the rare *Schizaea pusilla* Pursh, collected but once, at Grand Lake, near Halifax, by Mrs. Britton.

In view of this, it is worthy of remark that in the northern part of the island of Cape Breton there are two species, one of them widely distributed, which have never been reported from the peninsula, and several others which occur there but rarely.

Northern Cape Breton is a country of great natural beauty. Near both eastern and western coasts are ranges of hills, usually from eight to fourteen hundred feet in height, intersected by numerous brooks and river valleys. Except for these, much of the interior is a high table-land, at the extreme north often peat-bog. The flora though destitute of alpine forms is of great interest, many flowering plants also growing here which are either rarer or missing in the rest of the province.

Ferns grow here luxuriantly and in considerable variety. The three Osmundas reach the extreme north and twenty-six species and two varieties of Polypodiaceæ are with few exceptions very widely distributed.

Dryopteris Filix-mas (L.) Schott, which has aroused the most interest among Canadian botanists, is not found at all on the peninsula or in eastern New Brunswick. In Cape Breton it was first discovered upon Salt Mountain, Whycocomagh, by Dr. A. W. H. Lindsay, and subsequently at Aspy Bay, Lake Ainslie,

and Cape Mabou, by Dr. A. H. MacKay. Further investigation shows that its distribution in this region is very wide, though as a rule only a few plants are found at any one place. It has been gathered in three localities a few miles apart along Bay St. Lawrence, which bounds the island on the north, and beside the road leading thence to Aspy Bay. South of the latter the land is very rocky and barren and it is not found, but reappears at Clyburn Brook, Ingonish, the next bay to the south.

Search for it at Cheticamp and Margaree, on the west coast, proved unsuccessful, but it is abundant beside the beautiful lakes at Luggelaw, on the road thence to Baddeck. In the Mabou district, besides Dr. MacKay's station, it grows at the Coal Mines, at Glenora Falls, and on Glencoe Mountain nearly half way to the lakes. It probably extends still farther to the south.

A much rarer fern, not otherwise known in the maritime provinces, is *Polystichum Lonchitis* (L.) Roth, found by Dr. MacKay at Aspy Bay, and by the writer along the roadside near the top of Glencoe Mountain. Near it was *Asplenium viride* Huds., not yet found elsewhere in Cape Breton, and at only one place in Nova Scotia proper.

Polystichum Braunii (Spenner) Fée, local on the mainland, is here very abundant throughout the hill district, and in the north becomes a splendid plant with fronds often exceeding four feet in height.

Two plants, one fruiting, of *Woodsia glabella* R. Br. were found by N. D. MacTavish and the writer, on a rock near the summit of a hill 1,300 feet high at Cheticamp, while beside a brook at the base was a solitary specimen of *Filix bulbifera* (L.) Underw. Both species are decidedly rare elsewhere in the province.

The following also are found north of the Lakes, with hardly an exception, in great abundance: *Polypodium vulgare* L., *Pteridium aquilinum* (L.) Kuhn, *Asplenium acrostichoides* Sw., *A. Filix-foemina* (L.) Bernh., *Polystichum acrostichoides* (Michx.) Schott, *Dryopteris Noveboracensis* (L.) A. Gray, *D. Thelypteris* (L.) A. Gray, *D. cristata* (L.) A. Gray, *D. marginalis* (L.) A. Gray, *D. spinulosa* (Retz) Kuntze, *Phegopteris Phegopteris* (L.) Underw.,

P. Dryopteris (L.) Fée, *Filix fragilis* (L.) Underw., *Woodsia Ilvensis* (L.) R. Br., *Dennstaedtia punctilobula* (Michx.) Moore, *Matteuccia Struthiopteris* (L.) Todaro, and *Onoclea sensibilis* L.

South of the Lakes no additional species are known, unless an unverified report of *Adiantum pedatum* L. should prove correct. The Maiden-hair is one of the greatest rarities in Nova Scotia, hence the scepticism. The most promising district in the south-east is believed to be still unexplored by a botanist.

Woodwardia Virginica (L.) J. E. Smith, *Asplenium Trichomanes* L., *Dryopteris fragrans* (L.) Schott, *D. Boottii* (Tuckerm.) Underw., and *Woodsia obtusa* (Spreng.) Torr., all found in Nova Scotia, though rare, have not yet been collected in Cape Breton, in spite of the fact that two of them reach the western side of the Strait.

New York Botanical Garden.

THE TYPE-LOCALITY OF ARENARIA BREVIFOLIA

By Roland M. Harper

Arenaria brevifolia,* "the rarest of our eastern American Arenarias," † was for many years known only from the granite region of Middle Georgia, particularly on and around Stone Mountain, where it was collected by Canby in 1869 and by several other botanists in later years. (It has since been found in Rowan County, North Carolina, by Heller and Small, in Lee County, Alabama, by Professor Earle, and in DeKalb County, Alabama, by Dr. Mohr. At the last-named station it grew on Carboniferous sandstone, but at all the others its habitat is on granite.) It was natural to suppose, therefore, that the original specimens were collected by Nuttall somewhere in Middle Georgia, though not on Stone Mountain, which seems to have been unknown in Nuttall's time.

* *Arenaria brevifolia* Nutt.; T. & G. Fl. N. A. 1: 180. 1838.
Alsine brevifolia Chapm. Fl. S. States, 49. 1860.
Alsinopsis brevifolia Small, Fl. S. E. States, 420. 1903.
† Small, Bull. Torrey Club, 24: 332. 1897.

The only information given as to the geographical distribution of this species in the original description is "On rocks, Georgia," and the label of the type specimen in the Torrey Herbarium bears the same data. But a couple of years ago I came across a passage in the "Letters of Asa Gray" (p. 652) which throws more light on the subject, and this led me to investigate the matter. In a letter to Mr. Canby, dated May 12, 1875, and referring to a visit to Stone Mountain a few weeks before, Dr. Gray says: "The moment I set eyes on the *Arenaria* of Stone Mountain, I said, Ho! here is *A. brevifolia* Nuttall, of which I had only a single stalk in herbarium. Comparing now, I was right, and Nuttall says his specimen is from Tattnall County (which is strange, that being in southeast Georgia)."

Tattnall County is a typical pine-barren county, far down in the coastal plain (its center being about 100 miles from the granite region and 60 miles from the coast), and its natural features are altogether different from those of the granite region. It seemed therefore most likely that there must be some mistake about the report of *Arenaria brevifolia* from this county. But my curiosity was aroused, and having occasion to spend a few days in Tattnall County in the summer of 1903, I determined to do what I could toward verifying or disproving this report. On making inquiry for rock outcrops (which are not generally known to exist in the pine-barrens), I was soon directed to some, on the right bank of the Ohoopee River, about four miles from Reidsville. At this point there are some ledges jutting out from the hillsides close to the river, and near them a few flat outcrops of the same rock, covering several square rods. This rock is a rather fine-grained conglomerate, or indurated sand and clay, known to geologists as Altamaha Grit, and believed to be of Upper Oligocene age. The ledges have little vegetation on them except mosses and lichens, but the flat rocks, strange to say, support a flora strikingly similar to that of flat granite outcrops in Middle Georgia.

On reaching one of these flat rocks I got down on all fours, and almost immediately found the object of my search: *Arenaria brevifolia*. At that season of the year (June 24) the plants were

scarcely visible a yard away, being long past flowering. The stems are almost capillary and only two or three inches tall, the leaves had completely disappeared, and the minute capsules had already discharged their seeds. Consequently I did not preserve specimens at that time, but about ten months later (April 26, 1904) I revisited the spot and found the plant in better condition (no. 2157), though even then the flowers were gone and the

Locality for *Arenaria brevifolia*, in Tattnall County. Rock outcrop in foreground, dry pine-barrens in background. June 24, 1903.

capsules over-ripe. In that latitude it probably flowers in March, instead of in April as in Middle Georgia (or June in the mountains of Alabama, according to Dr. Mohr).

My locality, if not identical with Nuttall's, must be very near it. Rock outcrops are by no means common in Southeast Georgia, and all I have seen in Tattnall County are within five miles of each other. Nuttall, in describing a supposed new species of *Sarracenia* (*S. calcolata*),* states that he found it "particularly within a few miles of the new court house" in Tattnall County, and it is highly probable that he got the *Arenaria* at about the same time† and place. The *Sarracenia* (now referred to

* Trans. Am. Phil. Soc. 4: 49-51. *pl. 1.* 1834?

† Doubtless somewhere between 1822 and 1830, a period which seems to be left blank by Nuttall's biographers.

S. psittacina Mx.), it may be remarked, is now growing in the immediate vicinity of the *Arenaria* locality. The "new court house" mentioned by Nuttall is still standing in Reidsville, though it has recently been moved aside and superseded by a modern brick structure.

College Point, New York.

SHORTER NOTES

A New Polyporoid Genus from South America. — An interesting pore-fungus was collected a few years ago in Colombia by Mr. C. F. Baker. It is the only species of Polyporaceae known to me which occurs parasitic on living leaves. I have erected upon it the new genus *Phylloporia*, a description of which follows :

Phylloporia gen. nov.

Hymenophore small, tough, annual, attached by the vertex to the lower surface of living leaves; context brown, fibrous, tubes thin-walled, mouths polygonal ; spores globose, smooth, pale ferruginous.

The distinguishing feature of this genus is its habit of growing upon living leaves. It is based upon the following species :

Phylloporia parasitica sp. nov.

Pileus circular, thin, attached by its vertex to the under surface of living leaves, 5–8 mm. in diameter, 0.2–1 mm. thick ; surface minutely tomentose, fulvous, margin thin, entire, ochraceous to ferruginous ; context membranaceous, fibrous, ferruginous ; tubes 0.5 mm. or less in length, 3–7 to a millimeter, isabelline, polygonal, irregular, edges thin, entire to coarsely dentate ; spores globose, smooth, very pale ferruginous, 3–4 μ, hyphae concolorous.

Collected by C. F. Baker near Bonda, Colombia, Nov. 16, 1898, on living leaves of *Bignonia* (?). Numerous sporophores in various stages of development are found on the lower surface of the leaf, usually attached to a vein. This species is the only one of its family in America that occurs on living leaves.

Looked at from above, the host appears to be attacked by a leaf-parasite and it is quite surprising to find on the lower surface the sporosphores of one of the Polyporaceae.

William Alphonso Murrill.

New York Botanical Garden.

A New Species of Bradburya.—**Bradburya Floridana** Britton, sp. nov. Stem glabrous or nearly so, twining, 1 mm. long or more. Leaflets lanceolate to oval, thin but rather firm, glabrous, strongly reticulate-veined on both sides, blunt and aristulate at the apex, rounded at the base, 8 cm. long or less; petioles 2–5 cm. long, glabrous; petiolule of the terminal leaflet 1–1.7 cm. long, those of the lateral leaflets about 2 mm. long: peduncles axillary, pubescent, 6 cm. long or less; flowers several, on slender pubescent pedicels; bracts acute, pubescent, 1 cm. long or less: calyx-teeth lanceolate-subulate, as long as the hemispheric tube, on the upper one longer: standard white, striped and tinged with lavender, yellow-striped in the middle, 3–4 cm. broad: pod glabrous, flat, 11–12 cm. long, 6 mm. wide, its subulate beak 1.5 cm. long, its raised margins about 0.5 mm. wide.

Tampa, Florida, in dry soil, climbing on bushes, N. L. Britton and P. Wilson, Aug. 25, 1903, No. 81 (type); Florida, Chapman. Near *B. pubescens* (Benth.) Kuntze.

N. L. Britton.

New York Botanical Garden.

Rings in Bark Formed by Branches. — The bark of the white pine, *Pinus Strobus* L., as is well known, usually does not roughen until the tree becomes quite old, that is ten inches or upward in diameter, although I have seen trees five or six inches in diameter in which part way up the trunk the bark was rough for a distance of four or five feet, the balance both above and below being entirely smooth.

The branches are verticillate and numerous, although in heavy stands of timber the lower whorls usually die back when the shoots are about half an inch in diameter, and even higher up it is usually only three or four that persist and grow to any size. The effect is to give the otherwise smooth trunk a most curious ringed appearance, each ring of roughened bark about about two inches across marking the place of a whorl of branches. These

rings are a very prominent feature on all the trees that I have noticed and certainly deserve to be recorded.

EDWARD W. BERRY.

PASSAIC, NEW JERSEY.

NEWS ITEMS

Dr. and Mrs. N. L. Britton are in the Bahamas. They sailed from New York August 19, and expect to return some time before the end of the present month.

Dr. W. A. Murrill, who has been spending the summer in Virginia, has returned and taken up his work as assistant curator, in charge of the mycological department, at the New York Botanical Garden.

Dr. Otto Kuntze, of San Remo, Italy, widely known on account of his studies of problems in botanical nomenclature, has been in the United States recently on his return from a trip around the world. He sailed from New York on Saturday, September 10.

Among the distinguished visitors upon whom the degree of doctor of science was conferred by Cambridge University, on the occasion of the recent meeting of the British Association for the Advancement of Science, were Adolf Engler, professor of botany in the University of Berlin, and Sir William Turner Thisleton-Dyer, F.R.S., director of the Royal Botanic Garden at Kew.

Dr. N. L. Britton and Dr. J. N. Rose have taken up the study of the Cactaceae. They propose to gather large living collections both at New York and Washington, much as they have done with the Crassulaceae, and to continue their studies for a series of years, basing descriptions largely on living plants. Extensive field-work will be done, especially in Mexico, and the earnest coöperation of botanists travelling in the southwest is solicited. The National Museum will gladly furnish means for sending material to Washington.

According to the annual summary of doctorates conferred by American universities, published in *Science*, the number this year in botany is seventeen, while during the past six years the smallest

number has been eight, and the largest only twelve. Chemistry, as usual, heads the list, with about twice as many degrees as are granted in any other science ; this year botany and physics are a tie for the second place. Besides the seventeen degrees in botany we observe that several were taken in other subjects by persons who have done creditable botanical work.

Vol. 4 No. 10

TORREYA

October, 1904

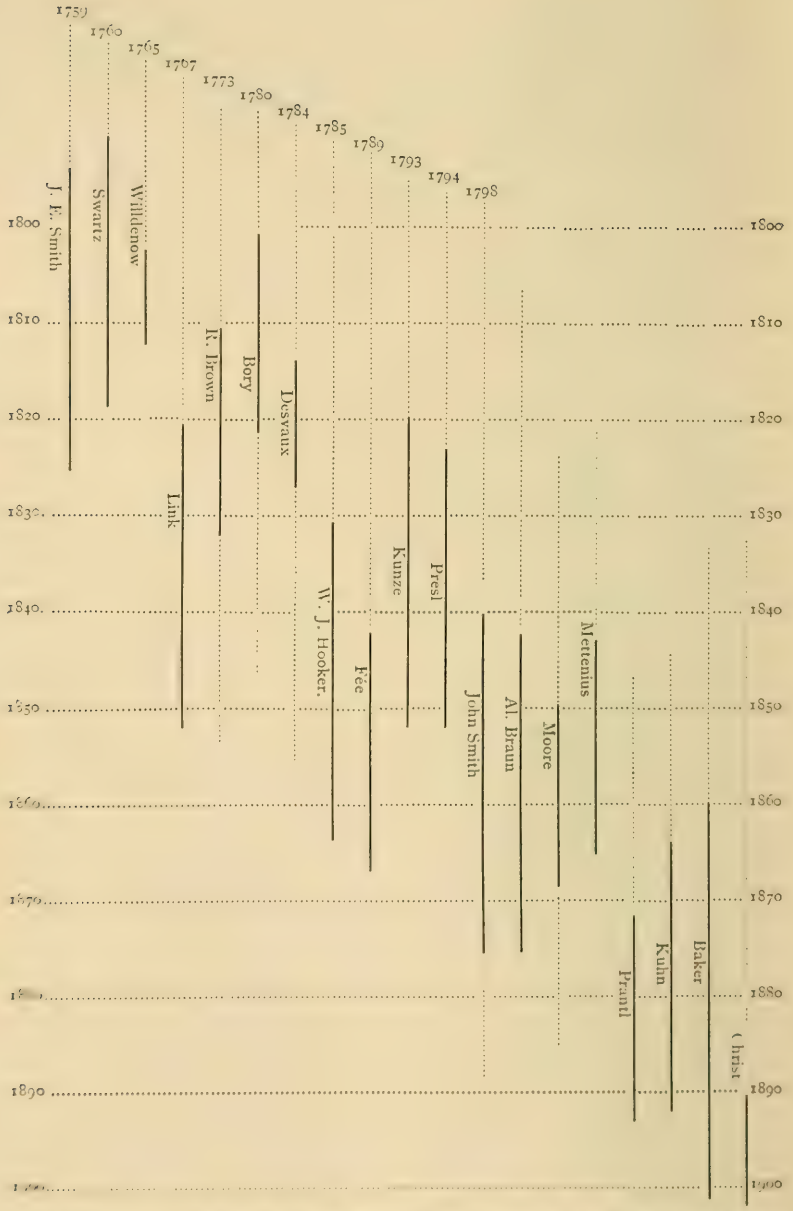
THE EARLY WRITERS ON FERNS AND THEIR COLLECTIONS — III. W. J. Hooker, 1785–1865

By L. M. Underwood

Following the period of J. E. Smith, Swartz, and Willdenow, and partly contemporaneous with it, were two or three men of minor rank in systematic fern study and yet men who did real and lasting work, both in extending the genera of ferns and in describing unknown species. Among these was the distinguished keeper of the botanical department of the British Museum, Robert Brown (1773–1858) whose keen understanding of generic relations among ferns will ever cause us to lament that his publications on the fern system were so limited and incomplete. Bory de St. Vincent (1780–1846) also published a number of fern genera as did also Link, of Berlin (1767–1851). But in the extent of published work, all of these were surpassed by Desvaux (1784–1856) professor of botany at Angers, whose synopsis (1827), the forerunner of modern generic limitations, is one of the too-often neglected but valuable works of the fern systematist of to-day. Desvaux's diagnoses are unfortunately too brief, and his types are often difficult to trace in the Museum of the Jardin des Plantes, but his views were usually rational and as the time goes on his species will be found to compare favorably with those established by others of this period.

In order better to orient the reader with regard to the various periods of systematic fern study we append the following chronological table:

[Vol. 4, No. 9, of Torreya, comprising pages 129–144, was issued September 30, 1904.]



(In the above table the entire line shows the life period, the solid line the period of publication on ferns.)

It is to England, however, that we must look for the greatest advance in the systematic study of ferns during the second quarter of the past century. W. J. Hooker, afterwards Sir William, the first director of Kew Gardens after Queen Victoria had opened them to the public, and father of the present Sir Joseph, who followed his father in that important post in 1865, was born in 1785 and thus was a correspondent in touch with all the earlier writers on ferns of the first years of the century.

In his earlier years of study, Hooker was associated with R. K. Greville, the distinguished cryptogamic botanist of Scotland, and with him published the elaborate folio in two volumes, *Icones Filicum* (1831), besides one or two preliminary papers on ferns and fern allies.* Greville's influence was most salutary in giving to their combined studies what would now be considered a more rational view of the limitation and distribution of species, and thus contrasts most strongly with the narrowly conservative ideas that dominated all the later writings of Sir William and his successors in fern study at Kew. A comparison of a few genera will strongly emphasize this statement.

Genera	Species recognized by Hooker & Greville in 1833	Species included in the first edition of *Synopsis Filicum*, 1868	Species of the *Synopsis* published subsequently to 1833
Ophioglossum.	18	10	2
Botrychium.	14	6	—
Marattia.	10	7	3
Danæa.	5	11	6
Angiopteris.	2	1	—
Osmunda.	12	6	—
Todea.	3	4	2

The appointment of Hooker to Kew made possible several opportunities which served to advance our knowledge of ferns and to lay the foundations at that herbarium of its present magnificent collection of ferns:

1. The increased exploration of distant lands made possible by the relation Kew has increasingly maintained towards commercial importation of ornamental plants and more especially by

* Greville & Hooker. Enumeratio Filicum (I. Lycopodineae). Bot. Miscellany, 2: 360–403. 1831; (II. Ophioglosseae, Marattiaceae, Osmundaceae). Bot. Miscellany, 3: 216–232. 1833. This work was unfortunately discontinued.

the intimate relations early established with the extensive system of colonial gardens and plantations which have ended in these adjuncts being almost wholly manned by men who were trained at Kew.

2. The increased facilities for the publication of extensive series of excellent illustrations of ferns. In this Hooker was greatly aided by the painter, Francis Bauer, to whom we are indebted for the admirable illustrations in *Genera Filicum*, and later by Mr. W. Fitch, for many years the artist of Kew Gardens.

3. By the selection of John Smith in 1841 as the curator of Kew Gardens, whose interest in fern cultivation resulted not only in bringing together the splendid collection of living ferns now in cultivation at that garden, but early laid the foundation of an elaborate generic system of ferns far more philosophical and rational than that followed by Hooker and his successors.

Whatever may be said in criticism of the conservative treatment of fern species or fern genera at Kew, no words can sufficiently convey the appreciation of fern students of every subsequent age for the elaborate and accurate illustrations, the magnificent fern herbarium, and the splendid collection of living ferns which have ever been available for study with a characteristic and open-hearted generosity that could not be exceeded.

Hooker's illustrated publications on ferns were as follows:

1. *Icones Filicum* (conjointly with Greville) 2 vols. 1831. 240 plates (hand-colored in some copies, not in others).

2. *Genera Filicum* (conjointly with Bauer). 1842. 120 colored plates.

3. *Species Filicum*. 1844–1864. 5 volumes of text and 304 plates (uncolored).

4. Garden Ferns. 1852. 64 colored plates.

5. A Century of Ferns. 1854. 100 colored plates. (This was a reissue of volume ten of *Icones Plantarum*, in which the plates were differently numbered and were uncolored).

6. *Filices Exoticae*. 1859. 100 colored plates.

7. A Second Century of Ferns. 1861. 100 colored plates.

8. British Ferns. 1861. 66 colored plates.

Besides the above there were numerous plates of ferns scat-

tered through various volumes of *Icones Plantarum*,* which brings the above total of 1074 plates up to over 1200. As the plates of *Genera Filicum* and *Species Filicum* often contain two or more species, the total number of ferns illustrated from Kew reaches nearly sixteen hundred species.

The Kew herbarium of ferns is by far the largest collection in the world and it is no disparagement to the other great collections to say that no extensive critical systematic work, whether dealing with the ferns of any genus or of any country, can be reasonably complete without consultation of this famous collection. Some of our distinguished German friends are respectfully urged to take the full import of this statement to heart. There is no excuse for continental botanists longer to neglect this obvious duty.

The same criticism here made on continental botanists of the present generation could have applied with equal force to Hooker himself. Notwithstanding his wide correspondence with botanists of his time, there was obvious failure to examine the types of his predecessors in fern study, and justice forces us to add an equal failure to recognize as valid too much of the work of many of his contemporaries. Cases are not wanting, even, where errors could have been easily avoided by taking the trouble to consult types no farther removed from Kew than the rooms of the Linnaean Society in London, and many of the species of Hooker's contemporaries were either discredited without being seen, or entirely passed over in silence. In the cases of Fée, Presl, and Kunze, this was specially pronounced.

Hooker's work ended in 1865 while he was bringing through the press the hand manual of "all known ferns" under the name of *Synopsis Filicum*, which was completed and brought through a second edition by his successor in the fern herbarium. In this work the extreme of conservatism is reached and its nearly three thousand species will expand to over four thousand before even the ferns of the great Kew herbarium of that date are fully enumerated, to say nothing of the two thousand that have been

* Volume 17 of *Icones Plantarum*, published however subsequently to Hooker's death, was devoted entirely to ferns.

since described and the many that were overlooked by the authors of *Synopsis Filicum*.

COLUMBIA UNIVERSITY, October 5, 1904.

A NEW SPECIES OF POLYPORUS FROM TENNESSEE

BY WILLIAM A. MURRILL.

Among the many interesting things found in the partially explored regions of Virginia and Tennessee during the past summer was a little undescribed species of true *Polyporus*, as the genus is at present limited. Considering the work already done in this group and the ease with which these plants as a group may be recognized, I was quite surprised at the find. It indicates the unfinished work at our very doors even in comparatively well-known genera of fungi and shows how much there is yet to be done by earnest collectors in almost any locality.

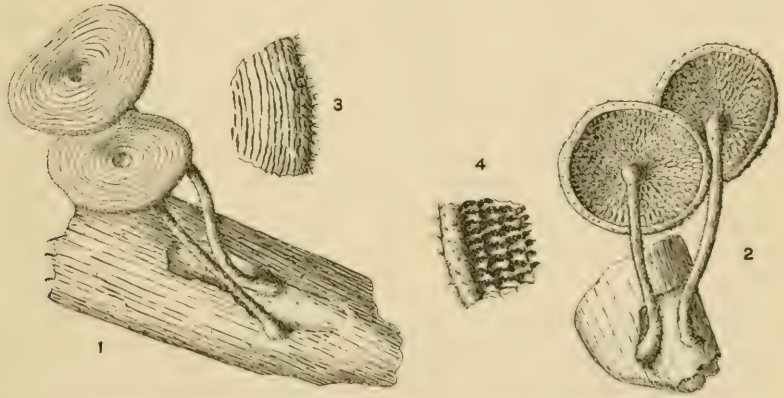
The genus *Polyporus* as at present limited comprises for the most part, small, central-stemmed plants found in the woods on fallen sticks and logs. Of the twenty-three North American species (Bulletin Torrey Club, **31**: 29. 1904), eight are known from Cuba only, one from Porto Rico, one from St. Kitts, two from Central America and one from various parts of Tropical America. This leaves only ten species to be met with in the United States; and only half of these, *i. e.*, *P. Polyporus*, *P. arcularius*, *P. elegans*, *P. fissus* and *P. caudicinus*, are to any extent common, the remaining five being extremely rare and local. Of these local species, Louisiana has one, Alabama one, Ohio one, South Carolina one and North Carolina one; and one is now known from Tennessee.

When I first saw this new plant in the rocky woods at Unaka Springs in East Tennessee, the resemblance to a little gray *Clitocybe* common in the same mountains was so striking that I came near passing it by; but upon closer examination it revealed the large pores, umbilicate pileus and hairy margin characteristic of the

section to which our common and widely distributed species *P. arcularius* belongs. It may be distinguished from that species, however, by its smaller size, thinner substance, gray color and slender, equal, less hairy stem. From the rare *P. arculariellus*, it differs decidedly in color and in being opaque instead of pellucid. A full description of the species follows:

Polyporus arculariformis sp. nov.

Pileus circular, umbilicate, 0.6–0.8 cm. × 0.05–0.1 cm., surface regularly concentrically rugose about the white, depressed center, isabelline to avellaneous, slightly imbricate-fibrillose; margin thin, acute, soon deflexed, nearly white, changing to isabelline, beset with numerous long, white, pointed cilia: context membranous, white, perfectly opaque: tubes 0.2–0.4 mm. long, 2–3 to a mm., radially elongated, decurrent, pallid, edges thin, irregularly toothed and fimbriate: spores hyaline, smooth, thin-walled, 2.3–2.5 μ × 7–8 μ: stipe central, stuffed, equal, concolorous, beset with sharp bristles which partially disappear with age, densely tomentose at the base, 1.5–2 cm. long, 0.5–1 mm. thick.



Polyporus arculariformis. Fig. 1. Entire plant, showing upper surface of pileus, × 2⅔. Fig. 2. Entire plant, showing lower surface of pileus, × 2⅔. Fig. 3. Portion of upper surface, × 8. Fig. 4. Portion of lower surface, × 8.

Unaka Springs, East Tennessee, 1,700 ft., on dead oak and chestnut sticks in deciduous woods, *Murrill*, August 20, 1904, nos. 702 (type) and 821. Near *P. arcularius* (Batsch) Fr.

New York Botanical Garden.

SHORTER NOTES

THE FLORIDA ROYAL PALM. — As previously recorded in Journal of the New York Botanical Garden, 5: 131, I visited, in company with Professor P. H. Rolfs, in March of this year, the colony of royal palms on Paradise Key in extreme southern Florida. I also visited with him another colony of these trees near Lemon City, a few miles north of Miami. Having in mind the proposition of Mr. O. F. Cook, that the Florida royal palm is a distinct species from the tree of Cuba, I carefully examined these trees and collected material from them, in order to satisfy myself as to the value of Mr. Cook's suggestion. The previous spring and autumn I had spent in Cuba and had become intimately acquainted with the tree there, obtaining abundant specimens for study. I wish to record that my observations are conclusive, I think, to show that the species are absolutely identical in foliage, inflorescence, and fruit, and that the greater size claimed by Mr. Cook for the Florida tree, does not hold for those that I examined at either point in Florida. As to the bulging trunk which Mr. Cook apparently thinks so characteristic, I would say that that occurs also in the Florida tree. There is a difference in habitat, however, between the greater number of royal palms of Cuba, which grow most abundantly on the upland, though I have repeatedly seen them growing on the borders of marshes, and the Florida trees, which stand just above the general level of the Everglades, on a low rocky ledge, amid a dense undergrowth of shrubs.

It should be said that I have not seen the colony of trees from which the specimen came on which Mr. Cook bases his *Roystonea Floridana* (*Curtiss*, no. 2676), which grow on the western border of the Everglades, some miles from the trees visited by us, so it is within the limits of possibility that the tree of the southeastern Everglades and that of the western Everglades are different, but an examination of a cotype of Mr. Cook's species does not give much chance for that view to be correct. I am therefore inclined to regard *Roystonea Floridana* as a straight synonym of *Roystonea regia*.

N. L. BRITTON.

Otto Kuntze on Sequoia. — One of Kuntze's innovations is the reference of the two living species of *Sequoia* to the genus *Steinhauera*.* The latter was established by Presl in 1838 † to include certain strobili of unknown affinity, so-called in honor of Henry Steinhauer. Three species were described, *i. e.*, *subglobosa*, *oblonga* and *minuta*, all from the Cretaceous at Perutz, Bohemia. A variety of remains of a more or less doubtful character have since been referred to this genus by various authors, which it would be unprofitable for me to discuss here. For a long time Presl's *subglobosa* has been assumed to represent cones of *Sequoia Sternbergi* Heer, and *minuta* the cones of *Sequoia Langsdorfii* (Brongn.) Heer, while *oblonga* has included a variety of objects, *e. g.*, fruits of *Liquidambar europaeum* A. Br.

Endlicher in 1847 established *Sequoia* for the California redwood. Now supposing that some day it is conclusively proven that *Sequoia sempervirens* is identical with *Sequoia Langsdorfii* which it resembles very much and which ranges in considerable abundance from the upper Cretaceous through the Tertiary. Should we then name the redwood *Steinhauera minuta* under which name Presl described certain fossil cones whose identification with those of *Sequoia Langsdorfii* is not altogether beyond question? I hold not. Priority may demand it but common sense makes it ridiculous, and so long as there are more students of the living than of the extinct floras of the globe, just so long would it be unwise to resurrect a name which was nothing but the name of a form-genus. It may be strictly canonical, but it would display a reverence for canon unsurpassed by some of the early fathers of "the true church." The strict interpretation of priority discloses many weird names, especially in the domain of fossil plants, such as *Palaeoxyris*, which may be vegetable or may be Paleozoic Selachian egg-cases; in either case it is in no wise related to the living genus *Xyris*, or *Prototaxites*, which in all probability is a Devonian fucoid in no wise related to *Taxites*.

The case presented by *Sequoia* is however an anomalous one that is not likely to present itself very often, and one that it

* Post & Kuntze, Lexicon Generum Phanerogamarum, 533 Stuttgart, 1904.

† Sternberg, Fl. d. Vorwelt, 2: 202.

seems to me should be settled once for all, by special dispensation, if no other way is available. While generic names are intended, I suppose, to be merely appellative and not descriptive, I cannot believe that it is for the best interests of science to perpetuate Kuntze's suggestion. EDWARD W. BERRY.

PASSAIC, N. J.

REVIEWS

A New Handbook of the Genera of Freshwater Algae*

Students and collectors often ask for a convenient work by which to identify the common algae of pond and brook which arouse the interest of every user of a microscope. There has been no good manual to recommend, for the works of Wolle and Cooke, never satisfactory, are quite out of date, and much the same may be said of the more elaborate works of the continental algologists. Professor West has produced a book which will be exceedingly useful, not only to amateur and more advanced students, but to teachers particularly; for within a surprisingly small compass he has given a good summary of recent work on the phylogeny of the algae, and brief but sufficiently clear descriptions to enable one without great difficulty to identify most of the genera of the United States. If disappointment is felt that specific diagnoses are not furnished, it is to be remembered that for a single author to include such in so extensive and diversified a group, would be to produce a work hardly more accurate than those we have found so unusable, as well as unwieldy in size.

The author divides the algae into the six classes, Rhodophyceae, Phaeophyceae, Chlorophyceae, Heterokontae, Bacillarieae and Myxophyceae (Cyanophyceae). Many will doubt the wisdom of including the last two groups with the higher algae but it will be at least a convenience to have this outline of their genera. The Peridinieae have been excluded for lack of space and because of doubt as to their affinities with algae. Similarly, the Characeae are omitted as being of higher organization than algae. It is certainly however, open to question whether the Characeae show

* West, G. S. A Treatise on the British Freshwater Algae. 8vo. Pp. xvi + 372. *f. 1–166.* Cambridge, at the University Press, 1904. Price, 10s. 6d., *net.*

greater affinities with the Archegoniatae, or less affinities with the main groups of algae, than the latter do among themselves. In the arrangement of the classes, and more particularly of the genera and families within the orders, it would be much more convenient for most teachers if the author had proceeded from lower to higher instead of in reverse order.

It is among the green algae that the greatest advance has been made recently and the chief value of this book is in the reclassification of these groups, for the old class Chlorophyceae cannot longer be maintained as a single group. Professor West's scheme is admittedly not original. He has followed the main lines marked out by Bohlin (1901) and Blackman and Tansley (1902); but he has taken only the best features of their rather brilliant and suggestive systems, and fallen back on the more conservative lines suggested by his own wide experience in various groups. The central idea in the recent systems is to go back to different flagellate ancestors for each of the classes of algae. The order Confervales (which might better be called Tribonematales) proposed by Borzi in 1889, and enlarged by Luther to the class Heterokontae, based upon a ciliated unicellular form having yellow-green chromatophores and producing oil rather than starch, on the whole, appears to be a very natural group; but we agree with Professor West that *Vaucheria* is too divergent a form to be included here. The author is wise also (and here he follows Bohlin) in retaining the Conjugatae and Oedogoniales as orders under the Chlorophyceae. The phylogeny of these groups is indeed puzzling, and the proposition of Blackman and Tansley to regard them respectively as classes Akontae and Stephanokontae, coördinate with the Chlorophyceae (Isokontae), furnishes an attractive and well-rounded scheme, but we have no evidence that they have had a similar origin in ciliated unicellular forms. On the contrary, West has argued well for the derivation of the Conjugatae from other filamentous forms. The orders Schizogoniales and Microsporales are here separated from Ulvales and Chaetophorales, and Cladophorales from Siphoneae. The creation of the new family Microthamniaceae appears to be superfluous, for my work has shown that

the zoöspore-formation in *Microthamnion* is most like that of *Myxonema* (*Stigeoclonium*), and *Gongrosira* and *Leptosira* may well be placed (as by Blackman and Tansley) in the Trentepohliaceae.

In the matter of nomenclature, the author has shown an open-minded regard for priority, though one may wonder why, while taking up *Choaspis* S. F. Gray for *Sirogonium* Kütz., he does not also revive *Agardhia* of the same work in place of *Mougeotia*. An unusual degree of familiarity with recent American work is evident, and the numerous references to such literature are among many good features which will commend this book to American students and teachers. TRACY E. HAZEN.

The Teaching of Biology in the Secondary School*

The volume recently issued under the above title is one of the American Teachers Series, edited by Professor James E. Russell, Dean of the Teachers College, Columbia University The two authors have charge, respectively, of the botanical and zoölogical work in the Teachers College and the present volume consists of two parts, the first on "The Teaching of Botany and of Nature Study," written by Professor Lloyd, and the second on "The Teaching of Zoölogy, including Human Physiology, in the Secondary School," written by Professor Bigelow. As is sufficiently indicated in the titles, the work is not a laboratory manual for the student, but aims to cover the much less occupied field of a manual for teachers. In fact, on the botanical side, "The Teaching Botanist," of Professor Ganong, is the only book known to the reviewer which may fairly be compared with it, a comparison which is invited, not only by the general similarity in the scope of the two works, but also by Professor Lloyd's frequent citation of "The Teaching Botanist" and by the association of Professors Ganong and Lloyd on the committee appointed by the Society for Plant Morphology and Physiology to consider the formulation of a standard college entrance option in botany. Whatever

* Lloyd, F. E., & Bigelow, M. A. The Teaching of Biology in the Secondary School. 8 vo. Pp. i–viii + 1–491. New York, Longmans, Green and Co. 1904. Price, $1.50.

may be the points of agreement in the general spirit of these two manuals for botanical teachers, there is in this newer effort by another vigorous, independent and resourceful teacher, enough of difference in the points of attack and in the development of the various themes to make it a very welcome and helpful addition to the working library of any one engaged in botanical instruction, whether in secondary school or in college. Professor Lloyd's part of the volume, which we assume to be the part that will be of especial interest to readers of TORREYA, is a philosophical essay on the value and objects of botanical teaching and on the principles determining the content of a botanical course, followed by a detailed discussion of the course in botany for the high school and by suggestions as to the laboratory, its equipment, and materials for study and for demonstration. References to the literature of the subject are numerous throughout, and a final chapter is devoted to a summary of the literature most important and useful to teachers and students.

The animus of Professor Lloyd's essays is well summed up in the following passage from the prefatory note: "It is to bring the student face to face with these problems [in connection with the teaching of botany] and to prepare him for their intelligent consideration, that this book has been written. Whether the solutions offered for such problems as have been discussed merit acceptance is of secondary moment, if in the use of these pages the student is stimulated to study carefully the subject of botany, not alone from the point of view of the scientist, but also from that of the educator. If the essay excites to 'self-activity, which is the best effect of any book' its chief use will be accomplished."

The author writes as one who is fully confident of the essential dignity and of the educational and economic value of botanical studies and as one who would help to rescue the subject from certain popular misconceptions and to place it on its proper footing in the public esteem. Botanical science, he says, "touches upon human interests fundamentally at every point, and these are of such a kind that to be ignorant of their relations to botany is to be robbed of that knowledge which throws light upon literature, the arts and manufactures, and upon conditions under

which alone the human race may prosper. * * * A plan of general education, therefore, which neglects botany neglects one of the subjects which Herbert Spencer describes as having 'transcendent value.'" *

Professor Lloyd's suggestive chapter on "Nature Study" is especially pertinent at this time when Professor Armstrong of the Mosely Educational Commission, sent from Great Britain to study the American school system, has remarked, perhaps with more justification than he has said some other things, that "The nature study lessons I witnessed, when not specifically botanical or zoölogical and scientific in character, were eminently superficial and worthless." † The authors of "The Teaching of Biology" would doubtless reply that any nature study lessons that are not "scientific in character" are of necessity "worthless" and that all nature study lessons that deserve the name, however simple and elementary, should, of equal necessity, be eminently "scientific in character." The "apparent failure of nature study in some quarters" would be referred by them to the inefficiency of the teachers and not to any lack of adaptability in the character of the subject matter. And it is to incite thought, discrimination and "self-activity" on the part of those who are charged with developing a scientific attitude of mind in the youth of our schools that "The Teaching of Biology" has been written. We predict that the book is destined to have an important influence in the direction desired by its authors.

MARSHALL A. HOWE.

NEWS ITEMS

Mr. Stewart H. Burnham is now a graduate assistant in botany in Cornell University.

Mr. E. W. D. Holway has been appointed assistant professor of botany in the University of Minnesota.

Mr. B. M. Everhart, well known by his association with Mr. J. B. Ellis in studies of the American fungi died at West Chester, Pennsylvania, on September 22, at the age of eighty-seven years.

* P. 73.

† Science II, 20: 132. 29 Jl. 1904.

An interesting account of the organization of the botanical work of the new Cuban agricultural experiment station is contributed to *Science* of September 30 by the director, Professor F. S. Earle.

Mr. Ira D. Cardiff, a graduate of Knox College, Galesburg, Illinois, and recently a graduate student at the Chicago University, has been appointed an assistant in botany in Columbia University.

Professor Francis E. Lloyd spent two months during the past summer at the Desert Botanical Laboratory of the Carnegie Institution at Tucson, Arizona, engaged in anatomical and physiological studies on the xerophytes of that region.

Mr. George V. Nash and Mr. Norman Taylor, of the New York Botanical Garden, sailed on October 5 for Great Inagua, Bahama Islands, with the purpose of making collections of living plants and of herbarium material.

Le Roy Abrams, A.M., recently assistant in botany in the Leland Stanford Junior University, is now in residence in New York as fellow in botany in Columbia University. Mr. Abrams will continue his studies on the flora of southern California.

The Department of Botany of Columbia University has been awarded a gold medal by the jury of the Louisiana Purchase Exposition for its exhibit of specimens in swinging frames. The exhibit was prepared under the direction of Dr. C. C. Curtis.

An informal reception was held in the rooms of the Department of Botany of Columbia University on the evening of October 4, in honor of Dr. Karl Goebel, professor of botany in the University of Munich and Dr. Hugo de Vries, professor of botany in the University of Amsterdam.

The lectures given by Professor de Vries at the University of California during the past summer, are being edited by Dr. D. T. MacDougal and will appear in a volume entitled, "Species and Varieties; Their Origin by Mutation," to be brought out by the Open Court Publishing Company of Chicago.

M. Auguste Le Jolis died at Cherbourg on August 20 in his eighty-first year. He was best known from his writings on the marine algae and in later years for his interest in nomenclatural questions. M. Le Jolis was the founder and for a half-century director of the *Société des Sciences naturelles de Cherbourg*.

C. Stuart Gager, Ph.D. (Cornell, 1902), for several years professor of biological science in the State Normal College, Albany, New York, has been appointed an assistant in the laboratories of the New York Botanical Garden. Dr. Gager will devote a considerable part of his time to a study of the histological and embryological characters of certain plant hybrids.

Frederick Orpen Bower, regius professor of botany in the University of Glasgow, who, with Professor Goebel, of Munich, was a speaker before the Section of Plant Physiology of the International Congress of Arts and Science at St. Louis, made two visits to New York during the month of September.

Professor L. R. Jones, of the University of Vermont, spent the summer in Europe as a special agent of the Bureau of Plant Industry, being commissioned to study diseases of the potato, with special reference to introducing disease-resisting strains. Professor Jones received the degree of doctor of philosophy at the last commencement of the University of Michigan.

The editor of TORREYA returned to New York on October 3, after an absence of four months in Europe, where he was occupied chiefly in studying the historical types of American marine algae. The principal collections examined were those of Harvey at Trinity College, Dublin; of Lamouroux at Caen; of Montagne, Decaisne, and De la Pylaie at Paris; of Kützing at Eerbeek, Holland; and of the Agardhs at Lund, Sweden.

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TORREYA

November, 1904

TWO HITHERTO CONFUSED SPECIES OF LUDWIGIA

By Roland M. Harper

In August, 1902, I collected on Cumberland Island, Georgia, specimens of a *Ludwigia* which appeared quite different from anything I had met with previously. From the available descriptions it seemed to fit readily enough into *L. virgata* Mx., but it differed in several characters, not mentioned in the descriptions, from the plant of the pine-barrens which I had been accustomed to call *L. virgata*. Later in the same season, and again in 1903, I met with the same unfamiliar plant quite frequently in the lower parts of the coastal plain, where it was often accompanied by the plant which I had previously taken for *L. virgata*.

Subsequent investigations in library and herbarium have convinced me that my Cumberland Island plant represents an undescribed species. Michaux's description of *Ludwigia virgata*, though longer than his average descriptions, leaves a good deal to be desired, as it fails to mention some characters (particularly the reflexed calyx-lobes) now regarded as essential for this species, but all the evidence obtainable from the works of Michaux and his contemporaries tends to confirm my original interpretation of his *L. virgata*.

The other species turns out to have been often collected, being perhaps the commoner of the two, but it does not seem to have ever received a valid name, having always been confounded with Michaux's plant; so I venture to describe it below as new.

[Vol. 4, No. 10, of Torreya, comprising pages 145-160, was issued October 29, 1904.]

In so doing I run a slight risk of creating a synonym, but this risk will doubtless be more than offset by the advantage of having these two distinct species brought out of the confusion in which they have been involved.

Omitting characters common to the whole genus *Ludwigia* and to the group with conspicuous petals, to which these species belong, they may be distinguished as follows:

LUDWIGIA VIRGATA Mx. Fl. Bor. Am. 1: 89. 1803

Type locality, "in aridis sylvis * Carolinae inferioris. Maio florens."

? *L. alternifolia* Walt. Fl. Car. 89. 1788.

? *L. juncea* Raf. Aut. Bot. 38. 1840. Type-locality, "Alabama."

Plant nearly glabrous throughout: branches few, mostly arising from near the base, fastigiate, terete: leaves linear to lanceolate, the upper successively smaller and passing into bracts which usually do not exceed the pedicels: sepals (or calyx-lobes they could just as well be called) 3 or 4 times as long as the ovary, permanently reflexed at anthesis: style twice as long as the stamens and a little longer than the sepals, slender at base, dilated above: stigma depressed, 3 or 4 times as broad as the style: capsule very slightly winged on the angles.†

Range and habitat: Normally in rather dry pine-barrens, North Carolina to Florida and Alabama (?), in the coastal plain.

The following specimens in the collections at the New York Botanical Garden are referable to this species:

NORTH CAROLINA: Savannahs near Wilmington, July 2, 1897, collector anonymous (Biltmore Herbarium, no. 4168).

SOUTH CAROLINA: 9 miles west of Charleston, Aug. 19, 1859, *L. R. Gibbes.*

GEORGIA: Sand-hills of the Altamaha, *Dr. Jones.* About Darien Junction, McIntosh Co., June, 1895, *Small.* Moist pine-barrens near Collins, Tattnall Co., July 4, 1901, *Harper* (no. 999).

* Probably meaning dry pine-barrens.

† This description is drawn principally from field-notes made in Chatham County, Georgia, June 13, 1903. The other species, which happened to be growing in the immediate vicinity, was carefully compared with it at the same time, and the differences noted on the spot.

FLORIDA: "In campis graminosis prope St. Mark's," July, 1843, *Rugel*. "Low pine-barrens, sometimes in rather dry places, July and August," *Chapman* (Biltmore Herbarium, no. 4168*c*).

Ludwigia maritima sp. nov.

"*L. virgata* Mx." Ell. Bot. S.C. & Ga. 1: 216. 1817.

Plant cinereous-puberulent, 3–6 dm. tall: branches mostly on the upper half of the plant, less distinctly virgate, slightly angled by the decurrent margins of the leaves: leaves lanceolate to oblong, sessile, the upper ones more conspicuous than in *L. virgata*: bracts usually equaling or exceeding the flowers: sepals about twice as long as the ovary, reflexed at anthesis, soon afterward ascending, finally deciduous: style shorter than the sepals and about the same length as the stamens, cylindrical: stigma hemispherical, twice as broad as the style: capsule distinctly winged on the angles.

In rather dry pine-barrens or meadow-like areas, South Carolina (?), Georgia and Florida to Mississippi, mostly near the coast.

Specimens examined:

GEORGIA: Meadow between dunes and beach, east of the hotel, Cumberland Island, Camden Co., Aug. 19, 1902, *Harper* (no. 1542) (type).

FLORIDA: Locality not specified, *Chapman* (no. 44); *Simpson*, 1889 (no. 4906). Low fields and roadsides, Duval Co., June, *A. H. Curtiss* (no. 918). Pablo, Duval Co., June 12, 1896, *L. H. Lighthipe* (no. 271). Low pine land near Eustis, May, 1894, *G. V. Nash* (no. 750). Flatwoods, Myers, July or August, 1900, *A. S. Hitchcock* (no. 120). Braidentown, June 29, 1900, *S. M. Tracy* (no. 7087). Tampa, Aug. 25, 1903, *Britton & Wilson* (no. 22). "In pinelands, Ft. Lauderdale," Nov. 19 or 25, 1903, *Small & Carter* (no. 1014).

ALABAMA: Locality not specified, *Gates*.

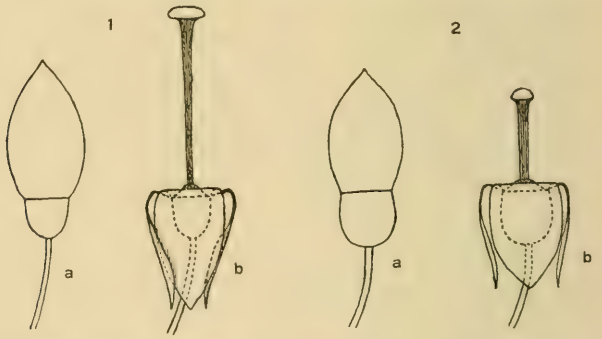
MISSISSIPPI: Point St. Martin, June 20, 1898, *S. M. Tracy* (no. 5067). Biloxi, Sept. 10, 1900, *Lloyd & Tracy* (no. 219).

Of Elliott's description above cited, which I have little doubt applies to this plant, Torrey and Gray say:* "The description of Elliott's *L. virgata* appears to be taken in part from *L. hirtella*,"

* Fl. N. A. 1: 523. 1840.

which was a pretty good guess under the circumstances. Elliott says of its habitat and time of flowering: "Grows in close soils. Very common. Less of an aquatic plant than any other species. Flowers May–September."

These two plants seem to show no tendency to intergrade, and when in flower can be distinguished without a moment's hesitation. The accompanying figures (drawn from memory of living



1. *Ludwigia virgata*. 2. *Ludwigia maritima*. *a*. Flower-bud just before anthesis. *b*. Flower just after anthesis. All twice natural size.

plants and checked up by comparison with dried specimens) show the principal diagnostic characters.

Both species have a marked tendency, more so than most pine-barren plants (in Georgia at least), to become weeds, particularly along railroad embankments and ditches.

L. maritima I have not seen more than 50 miles from the coast (except once in the vicinity of Valdosta), while *L. virgata* extends inland in Georgia to Sumter County, if not farther. And if the specimens cited fairly represent the ranges of these plants, *L. virgata* ranges farther east, and *L. maritima* farther west, with their ranges overlapping in Georgia and Florida.

College Point, New York.

A KEY TO THE PERENNIAL POLYPORACEAE OF TEMPERATE NORTH AMERICA

By William A. Murrill

Key to the Genera

Hymenium at first concealed by a volva. **A.** Cryptoporus
Hymenium free from the first.
  Surface covered with reddish varnish, context corky. **B.** Ganoderma
  Surface not covered with reddish varnish, or, if so, context woody.
    Context and tubes white or pallid. **C.** Fomes
    Context and tubes brown or dark red.
      Hymenophore subsessile, caespitose, arising from a common trunk or tubercle. **D.** Globifomes
      Hymenophore truly sessile, dimidiate or ungulate, simple or imbricate.
        Pileus covered with a horny crust, context punky. **E.** Elfvingia
        Pileus not covered with a horny crust or, if encrusted, context woody, ferruginous. **F.** Pyropolyporus
    Context dark purple or black. **G.** Nigrofomes

A. Key to the Species of Cryptoporus

1. Pileus rounded, sessile, the volva at length perforated at one or more points; found on dead trunks of conifers. *C. volvatus* (Peck) Shear

B Key to the Species of Ganoderma

1. Context pallid to tawny. 2
   Context umbrinous-chestnut. 4
2. Context pallid; plants annual, usually stipitate, growing on hemlock. *G. Tsugae* Murrill
   Context ochraceous to fulvous; plants sessile or stipitate, growing on deciduous trees. 3
3. Plants stipitate, rarely sessile, perennial; margin of pileus truncate at maturity. *G. flabelliforme* (Scop.) Murrill
   Plants sessile, annual; margin of pileus acute. *G. sessile* Murrill
4. Pileus zonate, even; tubes not stratified. *G. zonatum* Murrill
   Pileus sulcate, azonate; tubes stratified. *G. sulcatum* Murrill

C. Key to the Species of Fomes.

1. Context white or yellowish. 2
   Context flesh-colored, pileus flesh-colored, soon blackening. *F. roseus* (Alb. & Schw.) Cooke
2. Pileus more than 3 cm. broad. 3
   Pileus less than 3 cm. broad. 7

3. Pileus encrusted, surface darker than the context. 4
Pileus rarely encrusted, surface concolorous with the context. 8

4. Pileus thick, sulcate, ungulate, rarely applanate. 5
Pileus thin, distinctly zonate, irregular or applanate, crust brown to black; spores hyaline, $6 \times 4\,\mu$. *F. annosus* (Fr.) Cooke

5. Surface soon becoming rimose, deeply sulcate, older pores visible in the upper projecting annual layers; pileus exactly ungulate. *F. Ellisianus* Anders.
Surface not soon rimose, older pores not visible. 6

6. Pores 2–3 to a mm.; pileus subtriangular, gray to black, context white to pale cinnamon; spores $7–8\,\mu \times 6–7\,\mu$; abundant on *Fraxinus*.
F. fraxinophilus (Peck) Sacc.
Pores 4–5 to a mm.; pileus ungulate, applanate when very large, deeply annually sulcate, surface often resinous, bay or black in color; abundant on conifers.
F. ungulatus (Schaeff.) Sacc.

7. Pileus ungulate, becoming black only at the base, zonate and concentrically sulcate in age, tubes over 0.2 cm. long. *F. Ohiensis* (Berk.) Murrill
Pileus scutellate, uniformly black even when quite young, tubes less than 0.2 cm. long, context thinner than tube layer. *F. scutellatus* (Schw.) Cooke

8. Pileus cylindrical, tubes long, visible at edges of older strata, context friable, becoming bitter; growing on conifers. *F. Laricis* (Jacq.) Murrill

9. Tubes less than 2 mm. long each year, context punky, hymenium glistening, not becoming dark in color. *F. populinus* (Schum.) Cooke
Tubes more than 2 mm. long each year, context hard and rather friable, hymenium becoming smoky or brownish, cracking in age.
F. Melhae (Underw.) Murrill

D. Key to the Species of Globifomes.

1. Plant sweet-scented, growing on trunks of oak and beech.
G. graveolens (Schw.) Murrill

E. Key to the Species of Elfvingia.

1. Context ferruginous, spores hyaline, pileus usually ungulate. 2
Context fulvous to chocolate-brown, spores yellowish brown, pileus usually applanate. 3

2. Pileus exactly ungulate, pores 3 to a mm., growing in temperate regions south to Carolina. *E. fomentaria* (L.) Murrill
Pileus compressed-ungulate, pores 5 to a mm., growing in the Gulf States.
E. fasciata (Sw.) Murrill

3. Hymenophore annual, persisting above later growths, spores roughly echinulate $8–9\,\mu \times 7\,\mu$. *E. reniformis* (Morg.) Murrill
Hymenophore truly perennial, tubes stratified, spores smooth, $8–9\,\mu \times 5\,\mu$.
E. megaloma (Lév.) Murrill

F. Key to the Species of Pyropolyporus.

1. Pileus thick, ungulate, woody, margin obtuse. 2
Pileus thin, conchate or applanate, margin acute. 9

2. Context yellowish brown. 3
   Context reddish orange; plants growing on trunks of *Juniperus*. 8

3. Spores hyaline. 4
   Spores yellowish brown. 6

4. Pileus becoming more or less rimose with age. 5
   Pileus covered even in age with a smooth horny crust. *P. Calkinsii* Murrill

5. Pileus simple, sulcate, sometimes polished, margin usually narrow and rounded; not found on species of *Prunus*. *P. igniarius* (L.) Murrill
   Pileus terraced, imbricate or semi-resupinate, rarely sulcate, never polished, margin broad, making an obtuse angle; found on species of *Prunus*. *P. fulvus* (Scop.) Murrill

6. Pileus soon becoming rimose. 7
   Pileus not rimose, broadly sulcate, zonate, tubes thin-walled, spores 3 μ in diameter, spines large and abundant; growing on oak. *P. Everhartii* (Ell. & Gall.) Murrill

7. Tubes long, over 0.5 cm. each year, walls thin, pores large, 3 to a mm., spores 3–4 μ, cystidia present; rare on oak. *P. praerimosus* Murrill
   Tubes very short, 0.1–0.5 cm. long each year, walls equaling pores in thickness, mouths small, 5 to a mm., spores 4–5 μ, cystidia none; abundant on *Robinia*. *P. Robiniae* Murrill

8. Older pores visible in projecting annual layers, tubes 3–4 to a mm., thin-walled; pileus deeply furrowed, not rimose. *P. juniperinus* (Schrenk) Murrill
   Older pores not externally visible, tubes 1–2 to a mm., thicker-walled; surface very rimose. *P. Earlei* Murrill

9. Cystidia abundant, pointed, dark brown; pileus thin, rigid, tubes short, 5 to a mm. *P. conchatus* (Pers.) Murrill
   Cystidia none. 10

10. Pileus 10–25 cm. broad, marked with narrow shallow furrows, margin undulate or lobed, pores minute, 8–9 to a mm. *P. Langloisii* Murrill
    Pileus smaller, deeply sulcate, pores larger, 6 to a mm.; growing on species of *Ribes*, very rarely on other shrubs. *P. Ribis* (Schum.) Murrill

G. Key to the Species of Nigrofomes

1. Pileus large, sessile, context purple, tubes black, spores hyaline; found on trunks in Florida. *N. melanoporus* (Mont.) Murrill

New York Botanical Garden.

ADDITIONAL NOTES ON SOUTHERN ILLINOIS PLANTS

By H. A. Gleason

Pinus echinata Mill. Since the occurrence of this species in the Pine Hills of Union County was mentioned in this journal,*

*Torreya, 3: 1.

two other stations have been found, at Mill Creek, in the same county, and at Elco, Alexander County, located respectively twenty and twenty-five miles south of the Pine Hills. The three places are geologically similar, the underlying rock is the Clear Creek limestone, and the soil is residual, without a deposit of loess, which covers most of the southern Illinois hills. Since the same geological formation extends over most of the area between Elco and the Pine Hills it is very probable that other scattered groves of the pine occur upon it.

Lilium Catesbaei Walt. is reported from Jackson County by Professor G. H. French.

Castanea dentata (Marsh.) Borkh. There is no published record, in Patterson's Flora of Illinois or elsewhere, of the growth of this species in the state. It is, however, undoubtedly native in Pulaski County in the extreme southern part of the state on the Ohio River. It appears to grow only in the heavy clay soils of the Lafayette formation, and may occur in the adjacent counties where the same formation is found. A photograph sent by Mr. B. F. Gault represents a tree at least four, or possibly five feet in diameter.

Perilla frutescens (L.) Britton. This Asiatic mint, first reported from Illinois by Dr. Schneck,* is widely distributed over the southern part of the state and extends north as far as Centralia. In some places it is one of the commonest roadside weeds, growing in patches with *Amaranthus spinosus* and *Eleusine Indica*.

Hedeoma hispida Pursh. On thin dry soil overlying limestone ledges in Jackson County.

Pentstemon canescens Britton. Steep dry rocky hillsides in the Pine Hills, Union County. It also grows abundantly in similar situations across the Mississippi in Perry County, Missouri.

Houstonia lanceolata (Poir.) Britton. This species is reported from several stations in central and southern Illinois, and extends northward to Champaign County, in the east-central part of the state. It grows in a variety of conditions. In Champaign County it is found on the steep sides of clay bluffs with *Helian-*

* Cf. Pollard, Bot. Gaz. 21 : 233.

thus strumosus and *Taenidia integerrima*. On the prairies of central Illinois it forms circular patches of considerable extent, and in the Ozark region it is one of the commonest species in the semi-mesophytic upland woods, growing as scattered individuals.

Viburnum rufotomentosum Small. On dry ledges and in fissures of limestone cliffs, Jackson County.

Serinia oppositifolia (Raf.) Kuntz is abundant in Perry County, Missouri, growing in sandy soil along the Mississippi River, and also farther inland in dry upland woods. It has lately been collected by Mr. E. S. G. Titus near Eldorado, Illinois, where it grows in dry soil along a railroad, but in such surroundings that it appears indigenous.

Sitilias Caroliniana (Walt.) Raf. In wet, open places, Massac County.

Those areas in Virginia, Illinois and Missouri where the coastal plain, with its austro-riparian flora reaches into the so-called "Manual range" have always been a fertile field for collectors, and from them many additional species have been added to the "Manual flora." The work of B. F. Bush in the swamps of southeastern Missouri has been of particular importance because of the number of interesting species which he found there. Three of these species, not previously reported from Illinois, were collected in 1902 in the cypress swamps of Johnson and Massac counties: *Fraxinus profunda* Bush, *Styrax Americana* Lam., and *Itea Virginica* L.

Koellia incana (L.) Kuntze. The distribution of this species as stated in the Illustrated Flora (3: 114) or Britton's Manual (802) does not include Illinois, the range given being Maine to Ontario, Ohio and Florida. In southern Illinois it is abundant in upland woods and abandoned clearings, where the white canescent bracts make it very conspicuous. It has been collected in every county including and south of the Ozark uplift, but its northern limit in the state is as yet undetermined.

There are a number of other species in Illinois, whose range, as given in the two works mentioned, does not include this state. Among these may be mentioned the following: *Cunila origanoides* (L.) Britton is common in the upland woods of the extreme south-

ern part, and extends north as far as the mouth of the Illinois River, where it has been collected by Professor W. E. Andrews. *Spermacoce glabra* Michx. extends northward along the rivers well into central Illinois. *Triadenum petiolatum* (Walt.) Britton is common in the cypress swamps of Johnson and Massac counties, and *Agrimonia pumila* Muhl. in the upland woods of the Ozark region.

Ohio State University, Columbus.

SHORTER NOTES

Hymenoxys insignis — (*Actinella insignis*, A. Gray; S. Watson, Pr. Am. Acad., **18**: 109). In my recent paper on *Hymenoxys* (Bull. Torrey Club, **31**: 461. S 1904), I omitted this species, as I had seen only some fragments of a head, and was uncertain whether it was really of this genus. I have now examined the type sheet (from Lerios, 15 leagues E. of Saltillo, Mexico, 10,000 ft., *Palmer*) in the Gray Herbarium, and am satisfied that the plant is a *Hymenoxys*, most nearly allied to *H. chrysanthemoides*, but quite distinct.

T. D. A. Cockerell.

Rynchospora Pringlei Greenman. — This species, published in Proc. Am. Acad. **39**: 69. 25 S 1903, is the same as *R. Indianolensis* Small, Fl. S. E. U. S. 193. 22 Jl 1903. Mr. Greenman's specimens came from Zamora, Michoacan (Pringle, 8642) and Dr. Small's from Indianola, Texas (Ravenel). The species is next to *R. scutellata* Griseb. Pl. Cub. 246. 1866, to which it has been referred by Mr. C. B. Clarke, but it differs from that by its congested inflorescence with several or many spikelets in the clusters, and seems to me to be distinct.

N. L. Britton.

Notes on Cuban Plants. — *Dichrostachys nutans* (Pers.) Benth., an African tree, naturalized in Cuba, though apparently not heretofore reported from the West Indies, was observed in March, 1903, by Dr. Britton and the writer, forming dense thickets, covering several acres, almost to the exclusion of all other plants, on the grounds surrounding an old Spanish fort near the mouth of the Bueyvaca, on the Bay of Matanzas and several

miles east of the old town of the same name. Later, the writer again found it, abundantly forming thickets in the brickyard district just south of Havana. These thickets were strongly suggestive of the *Crataegus* "formations" so abundant in similar places about Pittsburg, Pa. It was also collected in flower by Dr. Britton and Percy Wilson, the following September at Bueyvaca and still further east, at Saguna.

Although it seems not to have been reported from the West Indies and was not observed by us as cultivated in Cuba, it has been in cultivation, according to Duss (no. 2040), on Guadeloupe Island under the name of "Acacia Lundea Roxb."

J. A. Shafer.

New York Botanical Garden.

A Peculiar Pea Seedling. — In handling the thousands of seedlings used by classes in our large city schools one comes across some queer freaks. The pea seedling shown at the right of the accompanying illustration was brought in by a boy in one

of my classes. At the left is a normal seedling. The peculiarity consists in the fact that both root and stem were negatively geotropic and both grew in the same direction.

When the plant reached me it was in excellent condition and there is no possibility of an artificial twist.

A. J. Grout.

Boys' High School, Brooklyn.

A New Bahaman Euphorbia. — While on a trip from New Providence to the Bimini Islands, anchor was cast for the night in the creek separating the Joulter Cays lying north of the island of Andros. The opportunity to examine into the flora of these xerophytic cays was an excellent one and the results proved highly interesting. One of the first patches of vegetation to attract the attention was what appeared to be a growth of *Euphorbia buxifolia* Lam. in a new environment, namely the interior, separated from the sands of the beach by a high bluff of coralline rock. Closer examination of the plants removed their likeness to the species mentioned, and later study proved the species to be heretofore unknown. The characters:

Euphorbia Cayensis sp. nov.

§ Chamaesyce. Annual, densely white-canescent. Stems stout, ligneous, multinodal, branching from below, 2–3 dm. high, spreading above: leaves thick, oval, obliquely cordate at the base, entire, canescent alike on both surfaces, 4–6 mm. × 3–4 mm., short-petioled; petioles 1–1.5 mm.: involucres campanulate, short-peduncled, 1.5 mm., canescent, bearded in the throat; appendages lineal, hardly distinguishable; glands green, transversely oblong, thick, tumid, 0.7 mm. broad; false gland a large deltoid tooth of the involucre: capsule canescent, 2 mm., the carpels bluntly keeled: seeds pinkish-ashen, somewhat quadrilaterally ovoid, strongly keeled on the dorsum, the facets slightly anastomose-ridged.

Habitat: Joulter's Cays, Bahamas, April 11, 1904; *Millspaugh* 2295. Only a few fruits matured. Type in herb. Field Columbian Museum, sheet no. 156261. Cotypes in herb. New York Botanical Garden and herb. Krug & Urban, Berlin.

C. F. Millspaugh.

Field Columbian Museum, Chicago.

The Effect of Illuminating Gas on Trees and Shrubs. — Early in the spring of this year about three dozen bushes of *Rosa rugosa* were planted on both sides of the road near the stone piers at the entrance to the New York Botanical Garden, between the railroad bridge at 200th Street and the driving roads. Those in the southern half promptly died, while those on the north side have lived and are doing well. This fact coupled with

the death of the maple immediately beyond the southern pier has shown conclusively that it is due to soil saturation by illuminating gas, and not to the disturbance caused by the making of the road. The main that supplies the museum building crosses the bridge between the southern roadway and the foot-path and

View at the 200th Street Entrance of the N. Y. Botanical Garden, Bronx Park, October, 1904.

makes an angle a short distance beyond the dead maple shown in the accompanying photograph. Several times leaks have occurred at this point and been repaired, but the damage has been done and one of the four symmetrical and beautiful sugar maples has suffered in consequence.

ELIZABETH G. BRITTON.

N. Y. BOTANICAL GARDEN, October, 1904.

A NAME EXPLAINED. — The ericaceous genus "*Xolisma*," as it is rather erroneously written, obtains a conspicuous place under its rightful name, in the second volume of Britton and Brown's Illustrated Flora, where, on page 569 the name is noted as "unexplained." The term is Greek, with the meaning of lameness, or defectiveness; and the character of the genus, as to certain particulars as they are mentioned by Nuttall, whose work Rafin-

esque was reviewing when he proposed "*Xolisma*," suggests a name of such import. The corollas in the genus are both so diminutive and so colorless compared with those of allied genera, that the inflorescence looks more like a cluster of small undeveloped flower buds than a cluster of developed flowers. The pedicels in kindred genera are bracted ; in this, bractless. Again, one member of each floral circle is commonly suppressed, so that the flower is often tetramerous rather than pentamerous as in related groups. The awns of the anther, otherwise almost universally characteristic of those of ericaceous shrubs, are wanting in this genus ; and lastly the stigma, usually prominent enough in such plants, is almost obsolete here. Without any doubt, some or all of these six characteristic deficiencies that mark the inflorescence and flowers of Nuttall's *Lyonia*, indicated to the keen intellect of Rafinesque the name he gave as a substitute for the Nuttallian homonym.

My investigations leading to this apparent explanation began in my knowledge of some of Rafinesque's own deficiencies as a writer. I knew, for example, that his X's are ambiguous. He seems never to have distinguished between the English X and the Greek X, which latter is Ch, pronounced like K. I do not know how the readers of the new books, in which I am always glad to see the name, pronounce it. But I know that Rafinesque must have pronounced it Kolisma, and also that he ought to have written it not *Xolisma* but *Cholisma ;* and the latter is the way that I should both write it and have it printed, if occasion came.

Possibly there may be other " X " names by the same author, in which that letter ought to have been represented by the Ch. However, I do not recall any such at this moment, nor have I time to examine indexes. But in scanning the pages of a theological brochure in which this same author displays more or less learning, I lately encountered the words " Xrist " " Xristians "; these illustrating the ambiguity of his X's elsewhere than in names of genera.

Edw. L. Greene.

U. S. National Museum, Washington, D. C.

Exogenous Origin of Antheridia in Anthoceros. — On pages 436–438 of volume 53 (1903) of the Oesterreichische Botanische Zeitschrift, Emma Lampa describes and figures organs which she calls antheridia of exogenous origin in *Anthoceros*. On first seeing this paper nearly a year ago, I was strongly impressed with doubts as to the antheridial nature of the organs described, and now that an American morphologist has quoted * without criticism this rather heterodox observation of Frau Lampa's, it may be worth while, even at the risk of being wholly in error, to record some of the grounds for these doubts. In the first place, the species in which the exogenous antheridia are said to occur is *Anthoceros dichotomus*, a South-European species which, like the Australian *Anthoceros tuberosus* † and the Californian *Anthoceros phymatodes*,‡ produces *tubers*,§ somewhat similar in form and structure to the alleged antheridia figured by Frau Lampa. These tubers arise near the apices of the branches of the thallus, but later become ventral by the continued growth of the branch. Frau Lampa makes no mention of having observed *tubers*, but remarks that "Die Antheridien sassen gewöhnlich am Thallusende." Furthermore, the pedicels of the "antheridia" as figured by Frau Lampa are very broad and stout, one of them showing a width of ten cells, whereas the pedicels of the antheridia in the genus *Anthoceros*, as figured and described by other observers || consist of no more than four rows of cells, showing a maximum width of only two or three in surface view

* Davis. B. M. The Relationships of Sexual Organs in Plants. Botanical Gazette, **38**: 253. O. 1904.

† See Ashworth, J. H. On the Structure and Contents of the Tubers of *Anthoceros tuberosus* Taylor. Pp. 1–6, *pl. 2*. Mem. and Proc. Manchester Lit. and Philosoph. Soc. **41**: part I, no. 2. 1896.

‡ Howe, M. A. Bull. Torrey Club, **25**: 12–14. *pl. 324, 325*. 1898. Mem. Torrey Club, **7**: 179–183. *pl. 117, 118*. 1899.

§ A figure of the tubers of *Anthoceros dichotomus* in their fully developed condition is given by Goebel on p. 293 of his Organographie der Pflanzen.

|| Waldner, M. Die Entwickelung des Antheridiums von Anthoceros. Sitzungsber. math.-naturwiss. Classe d. kaiserl. Akad. Wiss. Wien, **75**: 87, 91, etc., *f. 6a, 7a, 8*. 1877.

Campbell, D. H. The Structure and Development of the Mosses and Ferns, 124. 1895.

Schiffner; Eng. & Prantl, Nat. Pflanzenfam. 1^3: 137. 1895.

and ordinarily but two in longitudinal section. Frau Lampa remarks that the ripe antheridia showed no essential differences whether they were exogenous or endogenous in origin, but an *Anthoceros* antheridium, whether exogenous or endogenous, with a stalk ten cells broad is a heresy that will naturally excite suspicion among students of the archegoniates.

MARSHALL A. HOWE.

NEWS ITEMS

Dr. John K. Small, curator of the museums of the New York Botanical Garden, is again devoting several weeks to explorations in southern Florida.

Mr. Clifton D. Howe, assistant in botany in the University of Chicago, has been appointed instructor in botany in the Biltmore Forest School, Biltmore, North Carolina. He begins his new duties on January 1.

Annual meetings of the American Association for the Advancement of Science, of the Botanical Society of America, the Society for Plant Morphology and Physiology, and the American Mycological Society, will be held at Philadelphia, December 27–30, 1904.

Professor Nathaniel Lord Britton received the honorary degree of Doctor of Science from Columbia University October 31, at the Convocation held in connection with the 150th anniversary of the foundation of King's College. On the same occasion, the name of the chair now held by Professor L. M. Underwood was made the Torrey professorship of botany in honor of John Torrey, emeritus professor of botany in Columbia College from 1860 to 1873. The College of Physicians and Surgeons, in which Torrey was professor of chemistry and botany from 1827 to 1855, was made a part of Columbia University in 1891.

Vol. 4 No. 12

TORREYA

December, 1904

THE AMERICAN SENNAS

By J. A. Shafer

Several years ago, while bringing together material for the formation of a seed collection at the Carnegie Museum, Pittsburgh, Pa., a sample of a seed purporting to be that of *Cassia Marilandica* L. was received from Professor O. P. Medsger, of Jacobs Creek, Pa., which differed markedly, by its obovoid form, from any seed of the species that I had ever seen. Mr. Medsger, in assuring me of the authenticity of this seed, stated that he had collected the flat- as well as the obovoid-seeded form, in Westmoreland Co., Pa. With this explanation the matter rested until I myself collected, on the Ohio River just below Pittsburgh, fruiting specimens yielding the obovoid seed. About the same time, also, similar specimens were sent to me from Cumberland, Md., by Rev. G. Eifrig.

Careful search the following season was unrewarded with flowering specimens of the obovoid-seeded form, although many individual plants of the flat-seeded form were observed through the flowering to the fruiting stage both in their nativity and under cultivation, among the latter being a white-flowered sort. This failure to find the obovoid-seeded form, together with other circumstances, led me to surmise that the plant is a biennial; this, however, I have not as yet been able to verify.

In some thirty descriptions of *Cassia Marilandica* by about twenty-five authors, the form of the seed is mentioned but four times. Darlington * has them "compressed, ovate-oblong"; later † he omits "compressed" and they become "ovate-ob-

* Darlington, Flora Cestrica, 432. 1837. [Ed. 1.]

† Darlington, Flora Cestrica, 68. 1853. [Ed. 3.]

[Vol. 4, No. 11, of Torreya, comprising pages 161–176, was issued November 21, 1904.]

long." Torrey * makes them "large, compressed." Chapman,† while making no statement for the species, has his "var.? Floridana" "orbicular." The more recent authors ‡ are all broad enough in their descriptions to cover both forms.

The few illustrations are quite as unsatisfactory, many of them being meaningless; Dillenius,§ Barton,‖ and Bigelow,¶ the best of them, however, represent the flat-seeded form.

Just what Linnaeus** had is not clearly defined by his description or by most of his citations; Dillenius' "foliis mimosae siliqua hirsuta" and plate, however, is clearly the flat-seeded form and may be considered as establishing this as the true *Cassia Marilandica* L. Martyn's †† plate, also cited by Linnaeus, is characterless.

As the several names‡‡ that have been considered synonymous with *C. Marilandica* L. are all referable to the flat-seeded form, or at least have no reference to the obovoid-seeded one, I propose to name the latter for Professor O. P. Medsger, through whose material my attention was first called to it, and would characterize the two species as follows:

Cassia Marilandica L.

Plant erect, perennial, herbaceous, 1–2 m. high, little-branched: stem pubescent, slightly if at all furrowed, yellowish green: leaves with a club-shaped gland near base of the petiole; stipules subulate-filiform, ciliate on their margins, caducous; leaflets 12–20, elliptical, unequally rounded at base, mucronate, with reflexed ciliate margins, yellowish green, glaucous beneath, 3–5 cm. long, one third as wide: inflorescence racemose, pubescent, axillary and terminal, flowers many: calyx-lobes ovate, somewhat petaloid: petals broadly spatulate to obovate, obtuse, bright yellow: sta-

* Torrey, Flora of the North and Middle Sections of the U. S. 1: 439. 1824.

† Chapman, Flora of the Southern United States, 124. 1897. [Ed. 3.]

‡ Wood, Gray, Britton, Small.

§ Dillenius, Hortus Elthamensis, 351, *pl. 260. f. 339.* 1732.

‖ Barton, Vegetable Materia Medica of the U. S. 1: 137, *pl. 12.* 1817.

¶ Bigelow, American Medical Botany, 2: 166, *pl. 39.* 1818.

** Linnaeus, Species Plantarum, 378. 1753.

†† Martyn, Historia Plantarum Rariorum, 23. *pl. 23.* 1728.

‡‡ *C. acuminata* Moench, Meth. 273. 1794; *C. reflexa* Salisb. Prod. 326. 1796; *C. succedanea* "Bell, ex herb. Balb.," DC. Prod., 2: 498. 1825.

mens 10, unequal, upper 3 imperfect; anthers brown: ovary covered by long, outward-spreading hairs: pod falcate or nearly straight, linear, much compressed, 7–11 cm. long, 6 mm. wide and about 1.5 mm. thick, freely dehiscent along both sutures, brown, hirsute, the hairs pointing outward, apex acuminate, margins sometimes undulate, septa oblique, externally indicated by sharply defined narrow depressions: seeds 10–15, transverse, orbicular-quadrate, very flat, 5 mm. long, 4 mm. wide, 1 mm. thick, funiculus bent.

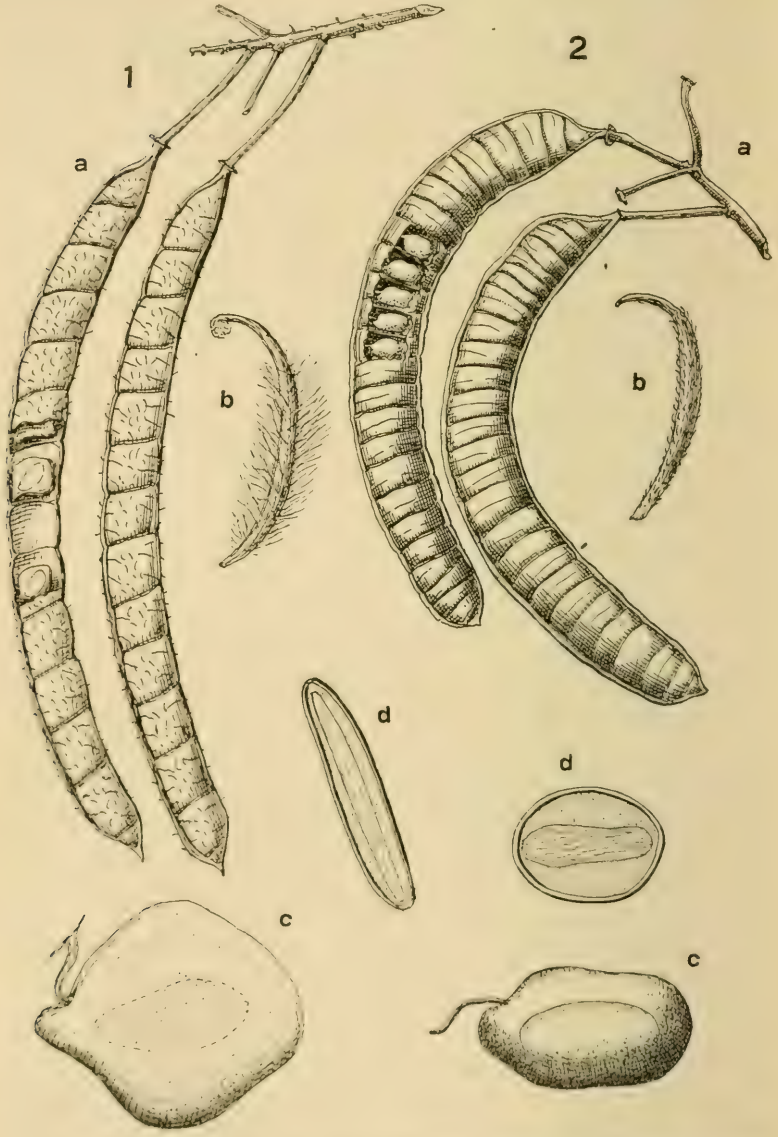
Specimens examined; * Massachusetts: Shirley, 1882, *H. H. Manning*; Roxbury, 1899, *L. T. Chamberlain*. New York: Peekskill, no date, *Dr. Torrey*; West Point, 1882, *E. A. Mearns*; Madison Co., 1893, and Herkimer Co., 1901, *H. D. House*. New Jersey: Connecticut Farm, 1820, Torrey Herbarium; Atlantic Co., 1883 (*708*), *C. A. Gross*. Pennsylvania: Bethlehem, 1832, *C. J. Moser*; Mercer Co., no date, *F. T. Aschmann*; Fayette Co., 1890, *C. C. Mellor*; Lancaster Co., 1883 (*708*), *Jas. Galen*; McCalls Ferry, 1893, *J. K. Small*; Beaver Co., 1900, Allegheny Co., several stations, *J. A. Shafer*; Westmoreland Co., 1900 and 1902, *Katherine R. Holmes*, and 1904, *J. A. Medsger*. West Virginia: Harper's Ferry, 1878, *G. Guttenberg*; Huttonville, 1890, and Minton, 1891, *C. F. Millspaugh*. Virginia: Wythe Co., 1892, *J. K. Small*. North Carolina: Biltmore Herbarium, 1896–7 (*301* and *391b*), and 1890, *Mary E. Reynolds*. Tennessee: Knox Co., 1894, *T. H. Kearney, Jr.*; 1896, *A. Ruth*. Kentucky: Fairbank, 1840, *C. W. Short*. Also many specimens in the local herbarium of the Torrey Botanical Club.

Cassia Medsgeri sp. nov.

Plant erect, 0.75–1.5 m. high, scarcely branched: stem longitudinally furrowed, smooth or nearly so, often purplish: leaves with petiolar gland near the base, cylindrical or abruptly constricted at its base; stipules linear-lanceolate, acuminate, caducous; leaflets 8–16, elliptical, unequally rounded at the base, mucronate, with reflexed, entire margins, green, slightly glaucous beneath, 3–5 cm. long, about one-third as wide: inflorescence corymbose, glabrous or nearly so, axillary and terminal, flowers rather few: calyx-lobes somewhat petaloid: petals broadly

* Contained in the herbaria of Columbia University, the New York Botanical Garden, and the Carnegie Museum.

spatulate, sometimes acutish: ovary scarcely covered by short, appressed hairs pointing towards apex: pod black, arcuate,



1. *Cassia Marilandica* L. 2. *Cassia Medsgeri* Shafer. *a*. Pods, natural size. *b*. Pistils, × 3. *c*. Seeds, × 8. *d*. Transverse sections of seeds, × 8.

broadly linear, scarcely compressed, 8–10 cm. long, 8–9 mm. wide, 3 mm. thick, dehiscent with difficulty if at all, apex blunt, rounded, mucronate, margins subentire, septa transverse, not well defined externally, hairs, if any, at the septal depressions, few and coarse and pointing toward apex: seeds 13–20, transverse, obovoid, 4 mm. long, 2 mm. in greatest diameter, funiculus straight.

Specimens examined; PENNSYLVANIA: Allegheny Co., 1900, *J. A. Shafer;* 1901, *J. M. Milligan.* Westmoreland Co., 1904, *O. P. Medsger* (type). MARYLAND: Cumberland, 1896, *Howard Shriver;* 1901, *Rev. G. Eifrig.* WEST VIRGINIA: Wheeling, 1879, *G. Guttenberg;* Sweet Springs, 1903 (*322*), *C. S. & Mrs. Steele.* VIRGINIA: Bedford Co., 1872, *A. H. Curtiss.* GEORGIA: Dalton, 1900 (*102*), *Percy Wilson.* ALABAMA: Clay Co., *F. S. Earle.* IOWA: Ringold Co., 1898, *Fitzpatrick Bros.* MISSOURI: Jackson Co., 1893 (*44*), and Campbell, 1895 (*195*), *B. F. Bush;* Riley Co., 1896, *J. B. Norton.* KANSAS: Johnson Co., 1892, *M. A. Carleton;* Ft. Riley, 1892 (*547*), *E. E. Gayle.* ARKANSAS: Lafayette Co., 1898, *A. A. & E. G. Heller;* Benton Co., 1899, *E. N. Plank.*

Cassia Medsgeri grows in dry gravelly situations, is less tall, less branched, of a darker color and is from ten days to two weeks later in flowering than *C. Marilandica*, from which it is easily distinguished by the differently shaped petiolar gland and stipules, less and differently pubescent ovary, darker, broader, and more curved pod, which is less clearly but more closely marked by the septa and almost indehiscent, also by the very differently shaped seeds.

NEW YORK BOTANICAL GARDEN.

A CASE OF IRREGULAR SECONDARY THICKENING

BY HERBERT MAULE RICHARDS

During last summer, while collecting in the woods in the neighborhood of Lake Placid, New York, the writer noticed that the lateral roots of the "yellow birch" — *Betula lutea* — often

presented a somewhat unusual appearance where they were growing over and around large rocks. The cross-section, instead of having the usual circular form, was more or less roughly elliptical, the roots being compressed laterally and expanded vertically. Such an appearance at once suggested unequal growth of the secondary layers of the wood and examination proved that this was the case.

In the specimen brought home and sectioned the greatest horizontal diameter of the root was 24 mm., while the vertical diameter measured 61 mm., exclusive of the rind, which was uniformly 1 mm. thick. As a result, the organ presented an almost plate-like form, suggestive of the supporting roots of some tropical trees. A section was obtained, thin enough to count the annual rings, and it could be seen that up to about its twenty-fifth year the development of the wood-layers was almost normal, with a slight tendency to epinastic growth (see figures). At this time the root had attained the diameter of about 16.5 mm., so that in breadth its subsequent growth was not more than 8 mm., while vertically it extended five and a half times as much. After the twenty-fifth year the annual rings were to be traced only with great difficulty on the sides, while above and below they were often 2 mm. and sometimes 4 mm. wide. There was not a great deal of difference in the rate of thickening on the upper and lower sides, though the hyponastic growth had a tendency to exceed the epinastic, especially from the thirty-third to forty-second years. The organic center of the root was then not greatly displaced from the actual axis of the organ. Such a condition has been described by C. Schimper as diplonasty. About 25 or 30 cm. further back, on the root, the hyponastic growth was more pronounced and more irregular. A hasty examination showed that the wood elements were smallest where the rings were compressed, but there seems also to be some difference in the number of wood-cells present in the different regions, being more, of course, where the ring was widest. This is worthy of notice because, in at least some cases of irregular thickening, it has been stated that the difference in the thickness of the rings was due alone to difference in the size of the wood elements.

Instances of irregular secondary thickening have been not infrequently cited. The classic examples of the plate roots in certain species of *Ficus*, or notably in the roots of *Parkia Africana*, may be mentioned, but there the excessive thickening is practically wholly epinastic. Epinastic or hyponastic thickening is mentioned by Haberlandt as occurring in the main branches of certain trees in the temperate region. Cases of diplonasty seem

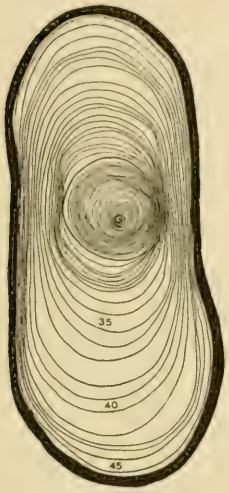


FIG. 1. Section of whole root showing rings of annual thickening. The numerals refer to the age. The twenty-fifth year is marked by a slightly heavier line. The rind is black. Nearly natural size.

FIG. 2. Enlarged view of transverse section of the first thirty years of growth. The annual rings are represented alternately black and white. Magnified about 3 diameters.

to be rarer. Specific instances do not seem to be generally cited in the ordinary literature; at least the writer was unable to find mention of any so well-marked case as that described above. Such irregularities are no doubt more common than one is led to believe from the references to them, and the writer would be glad to see specimens of this kind.

One naturally hesitates to make any too definite statement as to the causes of such thickenings, but Haberlandt's suggestion

that the abnormal growth is produced in response to mechanical exigencies is not unreasonable. Resting as these roots do on a hard, unyielding substratum, the compression strain brought to bear on them when the tree bends in the wind would be much greater than if they rested in soft soil. From a mechanical standpoint the vertical thickening of the wood would strengthen the root against such a strain. Such an explanation is certainly in accord with the general idea of the most economical expenditure of growth-energy and of material, which, as Haberlandt has pointed out, is as general in the development of trees as in any organisms.

Barnard College, New York.

THE BOLETACEAE OF PENNSYLVANIA

By D. R. Sumstine

Our state is well represented in the number of species belonging to this family. Nearly two thirds of all the species known in the United States have been reported from Pennsylvania. The following is a preliminary list of the genera and species.

Boletus affinis Peck §
albellus Peck §
alboater Schw.†
alutaceus Morg.§
alveolatus B. & C.‡
Americanus Peck *
auripes Peck §
auriporus Peck *
badiceps Peck §
betula Schw.†
bicolor Peck *
bovinus L.†
calopus Fr.†
castaneus Bull.*
chrysenteron Fr.*
chromapes Frost ‡
crassipes Peck §
decorus Frost §
dichrous Ellis ‡
edulis Bull.†
elegans Schum.§
eximius Peck ‡
felleus Bull.*
flavidus Fr.†
fragrans Vitt.§
Frostii Russell *
frustulosus Peck §
fulvus Peck §
glabellus Peck *
gracilis Peck ‡
granulatus L.*
griseus Frost *
illudens Peck §
impolitus Fr.§

indecisus Peck §
inflexus Peck ‡
innixus Peck *
luridus Schaeff.*
luteus L.†
miniato-olivaceus Frost *
mutabilis Morg.*
Morgani Peck *
nebulosus Peck §
nigrellus Peck *
ornatipes Peck *
pallidus Frost ‡
parasiticus Bull.*
piperatus Bull.*
Pocono Schw.†
purpureus Fr.§
radicans Pers.§
retipes B. & C.§
Russelli Frost *
rubropunctus Peck §
satanus Lenz §
scaber Fr.*
separans Peck *
sordidus Frost *
speciosus Frost §
spectabilis Peck §
subaureus Peck §
subluteus Peck ‡
subsanguineus Peck §
subtomentosus L.‡
subvelutipes Peck §
variegatus Swartz §
variipes Peck §
versipellis Fr.‡
Boletinus cavipes (Opat.) Kalch.§
paluster (Peck) Peck §
pictus (Peck) Peck §
porosus (Berk.) Peck *
Fistulina hepatica (Huds.) Fr.*
firma Peck *
Strobilomyces strobilaceus (Scop.) Berk.*
floccopus (Vahl) Sacc.*

B. inflexus has thus far been reported only from Pennsylvania. The species reported by Schweinitz in his Synopsis are included in Peck's Boleti of the United States.

KITTANNING, PA.
October 3, 1904.

RECENT CONTRIBUTIONS TO OUR KNOWLEDGE OF PALEOZOIC SEED-PLANTS‖

BY EDWARD W. BERRY

Undoubted seeds of a gymnospermous character have long been known in considerable abundance as low down in the geo-

* In writer's collection, Carnegie Museum, Pittsburgh.
† Peck, Boleti of the United States.
‡ Herbst, Fungal Flora of the Lehigh Valley.
§ McIlvaine, One Thousand American Fungi.
‖ Read before the Torrey Botanical Club, November 30, 1904.

logical scale as the Devonian, and by the Carboniferous they are very numerous in some localities, the coal-measures of both hemispheres furnishing them in considerable variety.

Little beyond descriptions based on external form are known of the seeds from American localities, where their preservation is poor as compared with the beautifully silicified and calcified remains from some of the European localities.

Brongniart as recently as 1881 * may be said to have laid the foundation for their scientific study.

In the light of the recent work, principally of Professors Oliver and Scott, the further study of these and similar remains assumes a special importance, and my excuse for this notice is the arrival in this country of the completed memoir of the above authors on the seed *Lagenostoma Lomaxi*,† which is thus far the most interesting as well as the best known fossil seed.

The fact of its definite reference to the plant which bore it is no little credit to the sagacity of the authors and to the methods of study inaugurated by the late Professor Williamson. The present memoir, which is well illustrated by seven plates and two text figures, sets forth in detail the structure of the seed and its cupule. The authors have handled all the extant material known, and their conclusions are admirable and convincing. They propose for this and similar fern-like spermatophytes a new class, the Pteridospermeae, for which Ward ‡ would establish the sub-kingdom Pteridospermaphyta in the anticipation, already partially verified, that the three great phyla of Paleozoic cryptogams independently acquired the seed habit.

The preliminary contribution of Oliver and Scott was read before the Royal Society in May, 1903, and in the short interval since we are able to record numerous contributions along the same lines. Since Potonié in 1897 established the order Cycadofilicales it has seemed probable that numerous forms of *Alethopteris*, *Pecopteris*, *Odontopteris*, *Neuropteris*, *Sphenopteris*, etc., were

* Brongniart, Adolphe. Recherches sur les graines fossiles silicifiées.

† Oliver, F. W., and Scott, D. H. On the Structure of the Palaeozoic Seed *Lagenostoma Lomaxi*. Phil. Trans. Roy. Soc. Lond. B. 197: 193–247. *pl. 4–10.* 17 Au 1904.

‡ Ward, L. F. Science, II. 20: 25, 279. 1904.

referable to this group rather than to the Filicales, the direct evidence for which has been slow in coming to light.

Before the publication of the final results of Messrs. Oliver and Scott, however, Kidston * announced the discovery of rhabdocarpous seeds on the rachis of *Neuropteris heterophylla*, a member of the Medulloseae, adding confirmation to the suspicion that the seeds known as Trigonocarpons were referable to this family of the Cycadofilicales.†

Following Kidston's discovery we find Grand 'Eury ‡ in March of this year and again in July, arguing before the French Academy the probability of the reference of certain of the silicified seeds from St. Etienne to various Filicean species.

In March we have further comments by Zeiller § ; and Renault ‖ in May reports his conviction that the seed *Stephanospermum* from Autun belongs to *Calamodendron* or *Arthropitys*. We learn further from Oliver and Scott's memoir that Arber is about to describe a fossil in which numerous *Lagenostoma*-like seeds are supposed to belong to a *Sphenopteris* frond.

With regard to the microsporangial apparatus of these various plants we know little beyond the suggestive work of Miss Benson ¶ on *Telangium*, which she regards as the microsporangial synangium of *Lyginodendron*. We are on safe ground in the assumption that in each of the three great cryptogamic phyla of the Paleozoic the seed habit was at least approximated, *e. g.*, among the fern-like plants we have positive proof in the case of

* Kidston, R. Proc. Roy. Soc. Lond. 72 : 487. D 1903.
Oliver, F. W. New Phytologist, 4 : 32. 1904.
Kidston, R. Philos. Trans. Roy. Soc. Lond. B. 197 : 1–5. 1904. [Illust.]

† Wild. On *Trigonocarpon olivaeforme*. Trans. Manchester Geol. Soc. 16. 1900.
Scott, D. H. On the Origin of Seed-bearing Plants. Roy. Inst. May 15, 1903.
Oliver, F. W. Notes on *Trigonocarpus*, etc. New Phytologist, 3 : 96–104. *pl. 2.* 1904.

‡ Grand 'Eury. Sur les rhizomes et les racines des Fougères fossiles et des Cycadofilices. Compt. rend. 138 : 607–610. 1904.
Grand 'Eury. Sur les graines des Néuroptéridées. Ibid. 139 : 23–27. 1904.

§ Zeiller, R. Observations au sujet du mode de fructification des Cycadofilicinées. Ibid. 138 : 663–665. 1904.

‖ Renault, B. Quelques remarques sur les cryptogames anciennes et les sols fossiles de végétation. Ibid. 138 : 1237–1239. 1904.

¶ Benson, M. Ann. Bot. 18 : 161–177. *pl. 11.* 1904.

Lagenostoma and *Neuropteris;* among the Calamites we have *Stephanospermum;* and among the Lepidodendraceae we have the seed-like fructifications named *Lepidocarpon* by Professor Scott. Sufficient proof, it seems to me, that we had in the Paleozoic a great plexus of plants of a type transitional between the Pteridophyta and the Spermatophyta, from some of which the gymnosperms took their origin.

SHORTER NOTES

Some Introduced Plants in Cuba.—It is well known that one of the most common methods for the distribution of weeds and various other plants from one locality to another is by means of seeds carried in food stuffs, bedding for animals, etc.

Recently while I was passing through the stable-yard of the Cuban Experiment Station, I discovered several plants of the common dandelion (*Taraxacum Taraxacum*). Following this discovery, in an investigation of the immediate vicinity, several other plants common to New York and other parts of the United States were found. Of the plants examined, numbering forty or fifty, some species were well represented, and with the exception of those growing in the coral-rock driveway, all were of recent growth, though normal in size. Inquiring at the stable as to the kinds of fodder used, I was shown several large sacks of oats, in which after a brief examination, many varieties of seeds, achenes and some dried fruits of common weeds were obtained. In former times large quantities of baled hay were used and this was scattered on the ground among the horses during the noon hour.

The following identified plants undoubtedly owe their occurrence to seeds that have either fallen directly from the hay to the ground, or perhaps more frequently have germinated from the excrement of the stock.

Lepidium Virginicum L.
Trifolium repens L.
Trifolium pratense L.
Trifolium hybridum L.
Plantago major L.
Plantago Rugelii Decne.
Plantago lanceolata L.
Taraxacum Taraxacum (L.) Karst.
Sonchus oleraceus L.

Percy Wilson.

REVIEWS

A Laboratory Guide in Elementary Bacteriology*

The third revised edition of W. D. Frost's "Laboratory Bacteriology," a handy volume of four hundred pages and forty or more illustrations, has just been published by the Macmillan Co. Previous editions of this work have been used with great success by Professor Frost at the University of Wisconsin, and in the present edition only such changes have been made as are necessitated by the rapid progress of this science and improvements in methods employed in its study and application.

The plan of the work remains the same. In the first part, requiring a half year for its completion, the general subject of bacteriology is taken up in the following order: technique, physiology, taxonomy, representative nonpathogenic forms and bacteriological analysis. The second part, dealing with medical bacteriology, is an application of the knowledge and skill gained in the first to a rather serious study of pathogenic bacteria, more recent and more technical methods being used in connection with many of the forms treated.

The author regards directions for laboratory exercises as fundamental. These directions have a constant and a variable part, the latter subject to modification as changes become necessary in the kind of organism, the kind of medium, the temperature, etc. An attempt is made to observe a logical order in the experiments, though the time required for individual experiments may vary widely. Cultural observations are conveniently recorded by means of charts, with which the book abounds.

The system of classification adopted is that of Migula, which is quite generally used. Many of the older names are to be looked for in the list of synonyms. Like all other good laboratory guides, Professor Frost's book is well supplied with lists of apparatus, texts, appendices, etc., and with helpful suggestions relative to their use. Appendix A is a key to the most common forms of bacteria usually encountered by the student.

WILLIAM A. MURRILL.

* Frost, William Dodge. A Laboratory Guide in Elementary Bacteriology. 8 vo.. Pp. i–vi + 1–395. New York, The Macmillan Co. 1904.

PROCEEDINGS OF THE CLUB

Wednesday, October 28, 1904

The meeting was held at the New York Botanical Garden at the usual hour, Dr. D. T. MacDougal occupying the chair. There were 19 members present.

A letter was read from the secretary of the Council of the Scientific Alliance notifying the Club that the Alliance had appropriated $50 from the Newberry Fund for grants in aid of research in botany or geology, and $400 from the Herrman Fund for grants in aid of any scientific investigations.

The first paper was by Dr. N. L. Britton under the title of "Notes on the Flora of the Bahamas." The speaker, in continuation of previous explorations, which were reported in Torreya for July, recently spent five weeks in the Bahamas, principally on the Island of New Providence.

About 950 native and naturalized species have been reported from the Bahama Islands, an unexpectedly small number, in part accounted for by the fact that most of the land does not reach an elevation of more than 25 feet although on one of the outer islands a height of 400 feet is recorded.

The flora is remarkable in the very unequal distribution of species, some being recorded from only one key. It is related to that of northern Cuba, extreme southern Florida, and in a lesser degree to that of Haiti. While the collections have as yet received only preliminary study, it is probable that ten or twelve new species will be founded on forms formerly thought to be identical with Cuban or other West Indian species.

The speaker gave a brief review of the flora, noting among other facts the presence of but five gymnosperms — a *Pinus*, three Zamias and a *Juniperus*. The lower monocotyledons are but poorly represented.

Of the grasses about fifty species were collected. These have not been studied, but it was noted that they show characteristic forms in each of the plant associations of the islands. One of the most interesting is the climbing bamboo, *Arthrostylidium capillifolium* Griseb., whose light green color gives a characteristic tinge

to the coppices. Seventeen species of sedges, none new, are to be added to the published flora of the islands. The palms are abundant and interesting, five species being reported. Eight or ten species of bromeliads, about twenty-five orchids, and four or five figs were reported. Among the Nyctaginaceae there are two trees heretofore referred to *Pisonia* but evidently not properly referable to that genus.

It was noted that most of the trees of the islands do not reach as great a height as they do in the Florida "hammocks." A water-lily, in habit resembling a small *Nelumbo*, and heretofore referred to *Castalia ampla* is of special interest. The coastal thickets furnished a beautiful species of *Parthenocissus* with scarlet pedicels. Among the abundant types were many Malvaceae, Celastraceae, Euphorbiaceae, herbaceous Papilionaceae and shrubby and arborescent Mimosaceae. Numerous photographs and specimens were exhibited.

The second paper was by Dr. Marshall A. Howe, who spoke on "The Algae of some European Herbaria." This was a general account of a trip undertaken during the past summer for the purpose of seeing and studying the historical types of American marine algae preserved in certain foreign herbaria. The first stop was at Trinity College, Dublin, where are found the collections of W. H. Harvey, author of the Nereis Boreali-Americana, and of several shorter papers on American seaweeds. In England, the three principal herbaria visited were those of the British Museum, the Linnaean herbarium, and that of the Royal Botanic Gardens at Kew.

In France, a few days were spent at Caen, in the department of Calvados, where are preserved the collections of several students of seaweeds, such as Roussel, Lamouroux, Chauvin, and Lenormand. Of these, the herbarium of Lamouroux is of chief interest, containing the materials from which thirty or more American species were first described.

At Paris, the collections of Montagne, of De la Pylaie, and of Decaisne, which are in possession of the Muséum d'Histoire Naturelle, were those chiefly studied, though a collection of Guadeloupe algae, issued by Mazé and Schramm, was also examined.

The next stop was Eerbeek, Holland, for the purpose of seeing certain originals of Kützing, now owned by Madame Weber-van Bosse.

In Oldenburg, Germany, a few types of Roth, and in Copenhagen a few of Lyngbye and of Vahl were seen. The longest stay of the trip was made at Lund, in southern Sweden, where a month was spent in studying the numerous American originals of the two Agardhs, father and son, who were actively engaged in describing marine algae for a period of ninety years. Specimens were taken to Europe by Dr. Howe for comparisons with the types. Photographs were obtained of over three hundred of the types examined, and these are expected to prove particularly useful, especially as many of the species have never been figured.

The next regular meeting falling on the evening of election day, on motion the club adjourned to the last Wednesday in November.

EDWARD W. BERRY,
Secretary.

NEWS ITEMS

Mr. Percy Wilson, recently assistant botanist of the agricultural experiment station of Cuba, is again administrative assistant at the New York Botanical Garden.

Dr. Valery Havard, surgeon, United States Army, and author of several papers on American economic plants, sailed for St. Petersburg on November 17, commissioned to proceed to Manchuria as military medical observer for the United States government.

Mr. George V. Nash and Mr. Norman Taylor returned to the New York Botanical Garden on November 11 with collections from Great Inagua and Little Inagua, Bahama Islands. Dr. John K. Small returned on December 4, from five weeks spent in making collections in southern Florida.

INDEX TO VOLUME IV.

New names and the names of new genera and species are printed in **boldface type.**

Vol. 4 January, 1904 No. 1

TORREYA

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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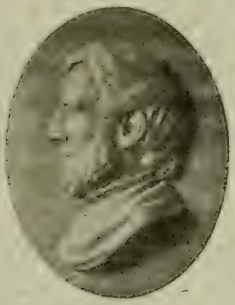

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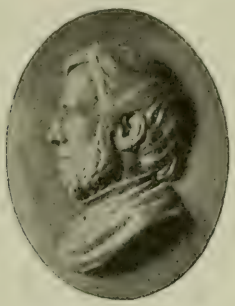

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TORREYA

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THE TORREY BOTANICAL CLUB

BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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